GB160
Service Manual

LG Electronics

Table Of Contents

1. INTRODUCTION

1.1 Purpose

This manual provides information necessary to repair, description and download the features of this model.

1.2 Regulatory Information

A. Security

Toll fraud, the unauthorized use of telecommunications system by an unauthorized part(for example ,persons other than your company's employees, agents, subcontractors, or person working on your company's behalf) can result in substantial additional charges for your telecommunications services.

System users are responsible for the security of own system. There are may be risks of toll fraud associated with your telecommunications system. System users are responsible for programming and configuring the equipment to prevent unauthorized use .The manufacturer dose not warrant that this product is immune from the above case but will prevent unauthorized use of common-carrier telecommunications service of facilities accessed through or connected to it.

The manufacturer will not be responsible for any charges that result from such unauthorized use.

B. Incidence of Harm

If a telephone company determines that the equipment provided to customer is faulty and possibly causing harm or interruption in service to the telephone network, it should disconnect telephone service until repair can be done. A telephone company may temporarily disconnect service as long as repair is not done.

C. Changes in Service

A local telephone company may make changes in its communications facilities or procedure. If these changes could reasonably be expected to affect the use of the this phone or compatibility with the network, the telephone company is required to give advanced written notice to the user, allowing the user to take appropriate steps to maintain telephone service.

D. Maintenance Limitations

Maintenance limitations on this model must be performed only by the manufacturer or its authorized agent . The user may not make any changes and/or repairs expect as specifically noted in this manual.

Therefore, note that authorized alternations or repair may affect the regulatory status of the system and may void any remaining warranty.

E. Notice of Radiated Emissions

This model complies with rules regarding radiation and radio frequency emission as defined by local regulatory agencies. In accordance with these agencies, you may be required to provide information such as the following to the end user.

F. Pictures

The pictures in this manual are for illustrative purposes only; your actual hardware may look slightly different.

G. Interference and Attenuation

Phone may interfere with sensitive laboratory equipment, medical equipment, etc. Interference from unsuppressed engines or electric motors may cause problems.

H. Electrostatic Sensitive Devices

ATTENTION

Boards, which contain Electrostatic Sensitive Devices(ESD),are indicated  **by the sign .**

Following information is ESD handing:

. Service personnel should ground themselves by using a wrist strap when exchange system boards.

. When repairs are made to a system board , they should spread the floor with anti-static mat which is
also grounded .

. Use a suitable, grounded soldering iron .

. Keep sensitive parts in these protective packages until these are used.

. When returning system boards or parts like EEPROM to the factory, use the protective packages as
described.

2. PERFORMANCE

2.1 H/W Features

Solution	MT6223D	Media Tek
Form Factor	Bar type	
Dimension (mm)	103x46x12.5 mm	
RF Band	Dual Band 900/1800 or Dual Band 850/1900	Internal Antenna
Data	GPRS Class 10	
Main Display	1.5" TFT 262K color, 128x128 Pixels	Serial Interface
Battery	950 mA h	Same as LG6/7/Sapphire-F
Audio player	Yes	MP3/64 polyphonic Midi
FM Receiver	Yes , US/Europe band	Option (87.5~108MHz)
Loud Speaker	Yes	
Memory Size	128Mb NOR Flash +32Mb PSRAM	
User Memory	Yes	2M Bytes
Scheduled FM recording	Yes	
FM as alarm	Yes	
WAP	Yes	V2.0
MMS	Yes	
OTA	Yes	
In flight mode	Yes	

2.2 S/W Features

2.2.1 General Features

Function	Target Specification	Parameter	Support
Basic Display	RSSI	(6 Level, 0~5)	Y
	Battery Indicator	(4 Level, 0~3)	Y
	Icons Indicator		Y
	Others reference to "Phone Personalization Setting"		Y
Speech Codec	FR/EFR/HR/AMR-NB		Y
Keypad	Number of Keys: 21Key (include 12 alphanumeric/number keys (0-9,#,*), 4 function keys, 4 way navigation keys)		Y
	Clear key		N
	International Access (+)(long 0)		Y
User Profile (Audio Settings)	User Selectable and Customizable Profiles (3 profiles: General, ~~Meeting~~, Outdoor, ~~Vibrate only, Headset,~~ Silent)		Y
	~~Auto-detect and activated profiles (1 profile: Headset)~~		N
	Key Tone		
	Key Tone Volume (**6 Level - 0 ~ 5**, 0 for Mute)		Y
	Key tone setting (**4 sets: Silent, DTMF, Piano, English human voice, Spanish human voice(Tigo), Russian human voice(CIS)**)		Y
	Ring Tone		
	Ring Tone Volume (**6 Level - 0 ~ 5**, 0 for Mute)		Y
Follow common UI	Built-in Ring Tone Pattern: **10**		Y
	Customizable Ring Tone Link: 5		Y
	Intelligent Call Alert		
	Digits To Sound Synthesizing		Y
	Alert Type		
	5 Types - Ring, Vibration Only, Vibration and Ring, Ring after vibration, Silent, ~~Light Only, Beep Once~~		Y

Function	Target Specification	Parameter	Support
	Power On Tone		
	Built-in Ring Tone Pattern: 2 (include Silent)		Y
	Power Off Tone		
	Built-in Ring Tone Pattern: **2** (include Silent)		Y
	Message Tone		
	Built-in Ring Tone Pattern: 6 (include Silent)		Y
	Warning Tone		
	Built-in Ring Tone Pattern: 1 (Only On/Off operation)		Y
	Error Tone		
	Built-in Ring Tone Pattern: 1 (Only On/Off operation)		Y
	Camp On Tone		
	Built-in Ring Tone Pattern: 1 (Only On/Off operation)		Y
	Connect Tone		
	Built-in Ring Tone Pattern: 1 (Only On/Off operation)		Y
	Status LED		N
	Charger-in Status LED		**N**
	Answer Mode		Y
	Any Key Answer		Y
	Auto (Only available for headset mode while headset plugged in)		Y
Personal Information Management	Calendar - Month view only		Y
	Scheduler - 6 fields (Date, Start time, End time, Note, Alarm, Repeat, expiration date)		Y
	To do list - 4 fields (Due date, note, Priority, Status)		Y
Tools and Utilities	**Alarm**		
Follow common UI	**5** sets of Alarm		Y

Function	Target Specification	Parameter	Support
	7 major fields for each set: On/Off, Time, Repeat type, Audio option, Tone, Snooze, Alert type		Y
	World Clock		
	Cities list: Tigo(58),CIS(69) cities		Y
	Daylight saving time support: activated by user selection(only for world clock)		Y
	Home city set		Y
	Calculator		
	Addition, Subtraction, Multiplication, Division		Y
	Unit Converter		
	Weight, Length		Y
	Currency Converter		
	Health		N
	BMI, Menstrual		N
Phone Personalization Setting	Greeting Text		Y
	Shortcuts		Y
	Flight Mode		Y
	Time and Date Setting		Y
	Wallpaper		Y
	Screen Saver		N
	Power On Animation		Y
	Power Off Animation		Y
	LCD Backlight		Y
	PLMN/Service Indicator (Display of PLMN Name/Service Provider Name from SIM)		Y
	Date Time Display		Y
	Own Number Display		Y
	Restore Factory Default Setting		Y
Security	Phone Lock		Y
Input Method	**Engine**		
	T9		Y
	Support Language		

Function	Target Specification	Parameter	Support
	Depends on customer and market requirement. Total supported languages will be limited to memory condition.		Y
	Predictive word input		**Y**
Game	2 embedded game		Y
	Settings: BGM, Sound Effect, Vibration		TBD

2.2.2 Networking Features

Function	Target Specification	Parameter	Support
GPRS	GPRS Multi slot Class 10		Y
Data Service	BS 24 - 26 (2400-9600 bit/s), asynchronous, non-transparent, UDI. CSD rate up to 9.6K bit/s		Y
Call History	Last Dialed Number : 50		Y
	Last Received Number : 50		Y
	Last Missed Number : 50		Y
	Scratch Pad Memory(Save an input number in call) : 1		Y
Call Cost	Last Call Time		Y
	Total Dialed Call Time		Y
	Total Received Call Time		Y
	Last Call Cost		Y
	Total Cost		Y
	Max Cost		Y
	Price Per Unit		Y
GPRS Counter	Last Sent (unit in Byte)		Y
	Last Received (unit in Byte)		Y
	All Sent (unit in Byte)		Y
	All Received (unit in Byte)		Y
Call Management	Call Swap		Y
	Call Retrieve		Y
	Automatic Redial		Y
	Speed Dialing		Y

Function	Target Specification	Parameter	Support
	Last Number Redial		Y
Call Related Supplementary Services	Call Hold		Y
	Call Waiting		Y
	Calling Line Identity Presentation		Y
	Calling Line Identity Restriction		Y
	Connected Identification Restriction		Y
	Call Divert All voice Calls		Y
	Call Divert if unreachable		Y
	Call Divert if no answer		Y
	Call Divert if busy		Y
	Call Divert all data calls		Y
	Cancel all divert		Y
	Call Barring All Outgoing Calls		Y
	Call Barring All Outgoing International Calls Call Barring All outgoing International except home		Y
	Call Barring All incoming Calls		Y
	Call Barring All incoming Calls when roaming		Y
	Multi-party Call (up to 7 calls, 5 in conference, 1 on held, 1 waiting)		Y
	Line switching (Line1, Line2) Call reminder (Off, Single, Periodic) Closed User Group		Y
Phone Book	Quick Search (Notice: Quick search function only works in Phonebook, SMS and MMS. In other application, this phone supports regular search.)		Y
	Alpha Store and Recall		Y
	Access Phone Book in call		Y
	Copy & Move		Y
	Fixed Dial Number		Y
	Service Dial Number		Y
	Speed Dial Number		Y
	SOS Number		Y

Function	Target Specification	Parameter	Support
	Entry : 500 names (10 fields – Name, Mobile, Home, Email address, Office number, Fax number, Associate Picture, Associate Sound, Caller group, memo)		Y
	Caller Group-7 caller group- **Friends, Family, College, VIP, Group1, Group2, No Group** (**4 fields – Name, Ring, Picture, Member list**)		Y
	Own Numbers: User can change the own numbers of handset. (Sets of own numbers depends on SIM)		Y
	vCard: (Edit, Send and Receive. 7 fields – Name, Mobile, Home, Company Name, Email Address, Office Number, Fax Number)	Version 2.1	Y
	Note: This phone doesn't support phone number search.		Y
Message	**SMS**		Y
	Standard SMS		Y
	SMS Reply Path		Y
	SMS Delivery Report **Valid period (1 hour/6 hours/12 hours/1 day/3 days/1 week/Maximum)** **Message Type (Text, Fax, Page, Email) Message Indication Type refer to GSM 03.40**		Y
	Basic text-only SMS as described in 3GPP TS 23.040 R5		Y
	Notice: This phone doesn't support video ring tone via SMS		Y
	SMS Character Sets Support		
	GSM7		Y
	UCS-2		Y
	EMS		

Function	Target Specification	Parameter	Support
	EMS Standard as described in 3GPP TS 23.040 R5 excluding WVG		Y
	EMS Text Format		
	Text Style : Normal, Bold, Italic, Underlined, Strikethrough		Y
	Text Alignment : Left, Right, Center		Y
	Text Size : Normal, Large, Small		Y
	EMS Image Support		
	1-bit small image 16x16 pixels black and white		Y
	1-bit large image 32x32 pixels black and white		Y
	1-bit variable image in single SMS packet		Y
	Extended black and white 1-bit image up to 255x255 pixels		Y
	Extended 6-bit image up to 255x255		Y
	Pre-defined animation		Y
	User-defined small animation 8x8 pixel 4-frame black and white		Y
	User-defined large animation 16x16 pixel 4-frame black and white		Y
	Pre-defined sound		Y
	User-defined i-Melody up to 128 bytes		Y
	LZSS compression algorithm		Y
	Re-use extended object		Y
	Object Distribution		Y
	User Prompt Indicator		Y
	Hyperlink format element		Y
	Extended Object Distribution		Y
	EMS Character Sets Support		Y
	GSM7		Y
	UCS-2		Y
	EMS Miscellaneous		Y

Function	Target Specification	Parameter	Support
	SMS Concatenation (8 Segments for MT/MO)		Y
	SMS Compression		Y
	MMS		Y
	MMS Standard as described in 3GPP TS 23.140 V4.8.0		Y
	Extract media from Message		Y
	Insert Media into message		Y
	OTA provisioning partially support (Network Profile setting		Y
	Auto download mode		Y
	Manual download mode		Y
	Operator can pre-configure the delivery mode		Y
	MMS notification with icon or Pop-up message display)		Y
	MMS Message Format		Y
	MMS SMIL (A subset of SMIL descried in the MMS Conformance Document 1.2)		Y
	MMS Character Sets Support		Y
	US-ASCII		Y
	Unicode		Y
	ISO-8859-1		Y
	UTF-16		Y
	UTF-8		Y
	MMS Images Support		Y
	WBMP Wireless bitmap		Y
	GIF87		**Y**
	GIF89a		**Y**
	JPEG (sw decode)		Y
	MMS Sound Formats Support		Y
	WAV		Y
	AMR		Y
	MIDI		Y
	MP3		Y

Function	Target Specification	Parameter	Support
	MMS Miscellaneous		Y
	Multipart binary MIME		Y
	Storage		Y
	Separated Inbox folder for SMS and MMS		Y
	Separated Outbox folder for SMS and MMS		Y
	Total **300** SMS in the storage of phone plus SIM including Inbox, outbox, sent and draft		Y
	Total **max** 100 (up to 300KB)MMS in the phone storage including Inbox, draft and Outbox Notice: Total MMS count need depends on user memory space.		Y
	Common Operation		Y
	Write Message		Y
	Read Message		Y
	Edit Message (For MMS, Edit only conformance messages, unknown media not supported, unknown SMIL not supported)		Y
	Reply Message		Y
	Send Message		Y
	Delete Message		Y
	Forward Message		Y
	Use Sender's Number		Y
	Message Templates		Y
	Extract media from Message (MMS/EMS)		Y
	Store Media (MMS/EMS)		Y
	Delete Media (MMS/EMS)		Y
Cell Broadcast	Read Cell Broadcast		Y
	Cell Broadcast Mode: Receive On/Off		Y
	Cell Broadcast Message Language		Y

Function	Target Specification	Parameter	Support
	Channel Setting		Y
Network	Automatic Network Selection		Y
	Manual Network Selection		Y
	Network Service Status		Y
	Preferred Network (User definition)		Y
	GPRS connection mode selection: Always, When Needed		Y
SIM	**Common Operation**		Y
	SIM Application Toolkit (Release 98 Class 2 certified)		Y
	Prepaid SIM operation		Y
	Security		Y
	PIN		Y
	Personalization (Service provider lock, Network lock)		Y
DTMF	DTMF Signaling		Y
	DTMF Enable & Disable		Y

2.2.3 Multimedia Features

Function	Target Specification	Parameter	Support
Camera			N
Image Viewer	Thumbnail supported		Y
	Browse Style: List, Matrix		Y
	View		Y
	Forward: To Wallpaper, Phonebook, ~~Screen Saver, Power On Display, Power Off Display,~~ MMS, ~~Bluetooth~~		Y
	Rename		Y
	Delete		Y
	Delete All		Y
	Sort: By Name, Type, Date,~~ Time, Size, None,~~		Y

Function	Target Specification	Parameter	Support
	Storage Selection: Get list from Phone, Memory card (Only available when external memory card supported)		N
	Image Format Support		
	JPEG Baseline (SW decode)		Y
	GIF87a		Y
	GIF89a		Y
	WBMP		Y
	BMP		Y
Music Player (follow common UI)	Play		Y
	Pause		Y
	Resume		Y
	Stop		Y
	Next		Y
	Previous		Y
	Storage Selection: Get list from Phone, Memory card (Only available when external memory card supported)		N
	Auto-Generate Playlist		Y
	Skin: 2 skins		Y
	Repeat Mode: Off, One Song, All Songs		Y
	Shuffle Play		Y
	Background Play		Y
	Equalizer Setting: 8 sets Normal, Bass, Dance, Classical, Treble, Party, Pop, Rock		Y
	Volume Control: **20 level (0 ~ 19, 0 for Mute)**		Y
	Playlist Edit: Add, Remove, Remove All		Y
	Sound Format Support		**Y**

Function	Target Specification	Parameter	Support
	MP3		Y
	AMR		Y
	MIDI		Y
	WAV		Y
Video Player			N
Video Recorder			N
Sound Recorder	Storage Selection: Phone, Memory card (Only available when external memory card supported)		N
	Encode Format: AMR, WAV		Y
	Record		Y
	Pause		Y
	Resume Recording		Y
	Stop		Y
Melody Compose ~~(Not available)~~	Edit		Y
	Play		Y
	Save		Y
	Instrument Selection: 10 types Piano, Guitar, Violin, Saxophone, Steel Drums, Flute, Harmonica, Trumpet, Music Box, Xylophone		Y
	Play Speed: Fast, Normal, Slow		Y
	[Notice] Melody composer only support one instrument in one melody file, so the last chosen instrument will be used to play this melody file		Y
FM Radio	Frequencies: 87.5 ~ 108.0 Skin: 2 skins		Y
	User definable Preset Channel List		Y
	Channel Auto Search		Y
	Background Play		Y
	Record		Y

Function	Target Specification	Parameter	Support
	Record Format: AMR(0.7K/s) Limit:2850sec (Based on user memory)		Y
	Record Storage: Phone memory~~, SD card (Option, follow common UI)~~ ~~(Only available when external memory card supported)~~	~~Only Memory Card~~ **Only in phone memory,** **not selectable**	**N**
	Preset Channel List generated by auto search		Y
JAVA			N

2.2.4 Connectivity Features

Function	Target Specification	Parameter	Support
WAP	WAP 2.0 Spec.		Y
	WAP Push OTA/Message		Y
	WAP Provisioning Service		Y
	CSD/GPRS data connection		Y
	Bookmark		Y
	Wireless Telephony Application (WTA) support: Only Public WTA support, supported functions listing below - * Make a telephone call * Send a string of DTMF tones over an established voice connection * Add an entry to the telephone book of the device		Y
	Supports WML, WCSS, XHTML mp		Y
USB	Mass Storage Device		N
	Virtual COM (PCSync)		N

3.TECHNICAL BRIEF

3.1 Digital Main Processor

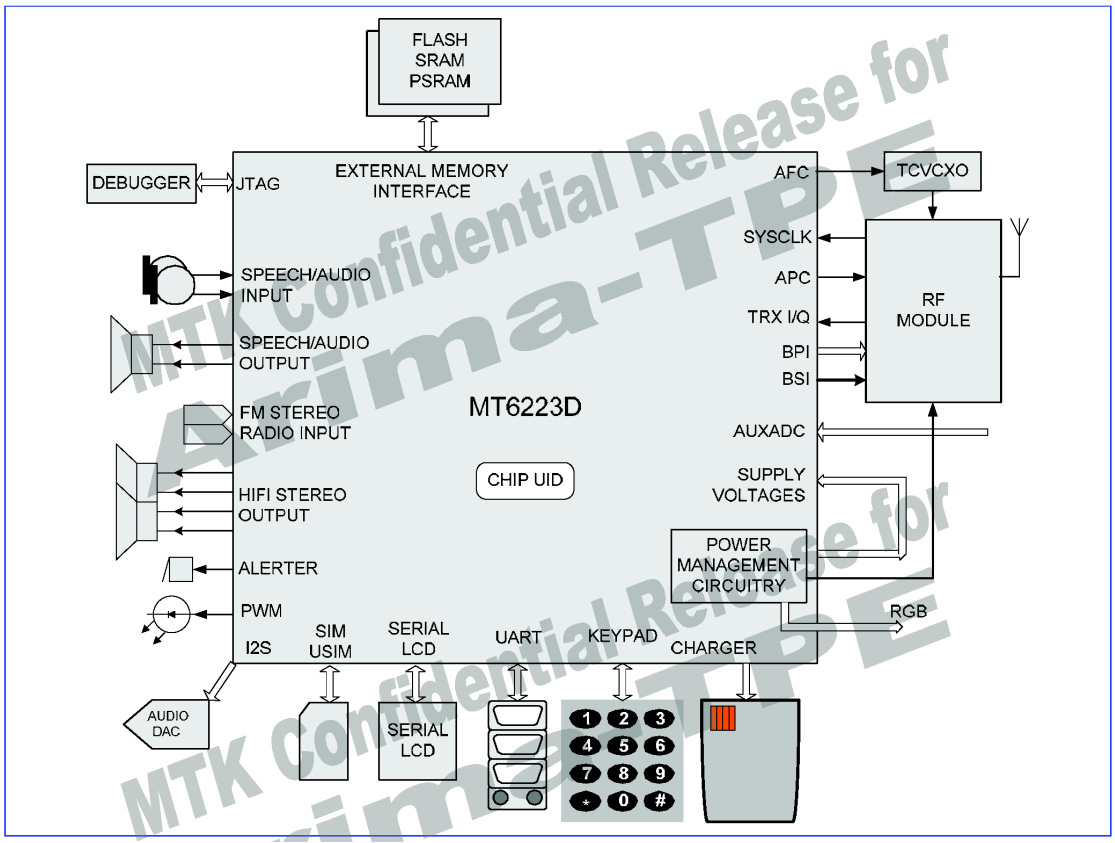

Figure.3-1-1 MT6223 FUNCTIONAL BLOCK DIAGRAM

MTK confidential Release for Arima-TPE

3.1.1 System Overview

MT6223D is an entry level chipset solution with class 12 GPRS/GSM modem. It integrates not only analog baseband but also power management blocks into one chip and can greatly reduce the component count and make smaller PCB size. Besides, MT6223D is capable of SAIC (Single Antenna Interference Cancellation) and AMR speech.

Based on 32 bit ARM7EJ-STM RISC processor, MT6223D provides an unprecedented platform for high quality Modem performance.

Platform

MT6223D runs the ARM7EJ-STM RISC processor at up to 52Mhz, thus providing best trade-off between system performance and power consumption.

For large amount of data transfer, high performance DMA (Direct Memory Access) with hardware flow control is implemented, which greatly enhances the data movement speed while reducing MCU processing load.

Targeted as a modem-centric platform for mobile applications, MT6223D also provides hardware security digital rights management for copyright protection. For further safeguarding, and to protect manufacturer's development investment, hardware flash content protection is also provided to prevent unauthorized porting of software load.

Memory

MT6223D supports up to 2 external state-of-the-art devices through its 16-bit host interface. Devices such as burst/page mode Flash, page mode SRAM, and Pseudo SRAM are supported. To minimize power consumption and ensure low noise, this interface is designed for flexible I/O voltage and allows lowering of supply voltage down to 1.8V. The driving strength is configurable for signal integrity adjustment. The data bus also employs retention technology to prevent the bus from floating during turn over.

Multi-media

MT6223D utilize high resolution audio DAC, digital audio, and audio synthesis technology to provide superior audio features., e.g. MP3 ring tone.

Connectivity, and Storage

MT6223D supports UART as well as Bluetooth interface. Also, necessary peripheral blocks are embedded for a voice centric phone: Keypad Scanner with the capability to detect multiple key presses, SIM Controller, Alerter, Real Time Clock, PWM, Serial LCD Controller, and General Purpose Programmable I/Os.

Audio

Using a highly integrated mixed-signal Audio Front-End, architecture of MT6223D allows for easy audio interfacing with direct connection to the audio transducers. The audio interface integrates D/A and A/D Converters for Voice band, as well as high resolution Stereo D/A Converters for Audio band. In addition, MT6223D also provides Stereo Input and Analog Mux. MT6223D also supports AMR codec to adaptively optimize speech and audio quality.

Radio

MT6223D integrates a mixed-signal Baseband front-end in order to provide a well-organized radio interface with flexibility for efficient customization. It contains gain and offset calibration mechanisms, and filters with programmable coefficients for comprehensive compatibility control on RF modules. This approach also allows the usage of a high resolution D/A Converter for controlling VCXO or crystal, thus reducing the need for expensive TCVCXO. MT6223D achieve great MODEM performance by utilizing 14-bit high resolution A/D Converter in the RF downlink path. Furthermore, to reduce the need for extra external current-driving component, the driving strength of some BPI outputs is designed to be configurable.

Debug Function

The JTAG interface enables in-circuit debugging of software program with the ARM7EJ-S core. With this standardized debugging interface, MT6223D provides developers with a wide set of options in choosing ARM development kits from different third party vendors. Low Power Features MT6223D offers various low-power features to help reduce system power consumption. These features include Pause Mode of 32KHz clocking at Standby State, Power Down Mode for individual peripherals, and Processor Sleep Mode. In addition, MT6223D are also fabricated in advanced low leakage CMOS process, hence providing an overall ultra low leakage solution.

Power Management

MT6223D integrates all regulators that a voice-centric phone needs. Seven LDOs optimized for Specific GSM/GPRS baseband sub-systems are included, and a RF transceiver needed LDO is also built-in. Besides Li-Ion battery charge function, SIM card level shifter interface, two open-drain output switches to control the LED and vibrator are equipped. Other power management schemes such as thermal overload protection, Under Voltage Lock-out Protection (UVLO), over voltage protection and oower-on reset and start-up timer are also MT6223D features. Besides, 3 NMOS switches controlling the RGB LEDs are also embedded to reduce BOM coount.

Package

The MT6223D device is offered in 9mm×9mm, 224-ball,
0.5 mm pitch, TFBGA package.

3.1.2 Platform Feature

General

Integrated voice-band, audio-band and base-band analog front ends
TFBGA 9mm×9mm, 224-ball, 0.5 mm pitch package

MCU Subsystem

ARM7EJ-S 32-bit RISC processor
High performance multi-layer AMBA bus
Java hardware acceleration for fast Java-based games and applets
Operating frequency: 26/52 MHz

Dedicated DMA bus
7 DMA channels
320K bits on-chip SRAM
On-chip boot ROM for Factory Flash Programming
Watchdog timer for system crash recovery
3 sets of General Purpose Timer
Circuit Switch Data coprocessor
Division coprocessor

External Memory Interface

Supports up to 2 external devices
Supports 16-bit memory components with maximum size of up to 128M Bytes each
Supports Flash and SRAM/PSRAM with Page Mode or Burst Mode
Industry standard serial LCD Interface
Supports multi-media companion chips with 8/16 bits data width
Flexible I/O voltage of 1.8V ~ 2.8V for memory interface
Configurable driving strength for memory interface

User Interfaces

5-row × 7-column keypad controller with hardware scanner
Supports multiple key presses for gaming
SIM/USIM Controller with hardware T=0/T=1 protocol control
Real Time Clock (RTC) operating with a separate power supply
General Purpose I/Os (GPIOs)
2 Sets of Pulse Width Modulation (PWM) Output
Alerter Output with Enhanced PWM or PDM
6 external interrupt lines

Security

Supports security key and 59 bit chip unique ID

Connectivity

3 UARTs with hardware flow control and speed up to 921600 bps
DAI/PCM and I2S interface for Audio application

Low Power Schemes

Power Down Mode for analog and digital circuits
Processor Sleep Mode
Pause Mode of 32KHz clocking at Standby State
3-channel Auxiliary 10-bit A/D Converter for application usage other than battery monitoring

Power and Supply Management

2.8V to 5.5V Input Range
Charger Input up to 8V
Seven LDOs Optimized for Specific GSM

Sub-systems
One LDO for RF transceiver
High Operation Efficiency and Low Stand-by Current
Li-Ion Battery Charge function
SIM Card Interface
Two Open-Drain Output Switches to Control the LED and Vibrator
Three NMOS switches to control RGB LEDs
Thermal Overload Protection
Under Voltage Lock-out Protection
Over Voltage Protection
Power-on Reset and Start-up Timer

Test and Debug

Built-in digital and analog loop back modes for both Audio and Baseband Front-End
DAI port complying with GSM Rec.11.10
JTAG port for debugging embedded MCU

3.1.3 MODEM Features

Radio Interface and Baseband Front End

GMSK modulator with analog I and Q channel outputs
10-bit D/A Converter for uplink baseband I and Q signals
14-bit high resolution A/D Converter for downlink baseband I and Q signals
Calibration mechanism of offset and gain mismatch for baseband A/D Converter and D/A Converter
10-bit D/A Converter for Automatic Power Control
13-bit high resolution D/A Converter for Automatic Frequency Control
Programmable Radio RX filter with adaptive bandwidth control
Dedicated Rx filter for FB acquisition
2 Channels Baseband Serial Interface (BSI) with 3-wire control
Bi-directional BSI interface. RF chip register read access with 3-wire or 4-wire interface.
10-Pin Baseband Parallel Interface (BPI) with programmable driving strength
Multi-band support

Voice and Modem CODEC

Dial tone generation
Voice Memo
Noise Reduction
Echo Suppression
Advanced Sidetone Oscillation Reduction
Digital sidetone generator with programmable gain

Two programmable acoustic compensation filters

GSM/GPRS quad vocoders for adaptive multirate (AMR), enhanced full rate (EFR), full rate (FR) and half rate (HR)

GSM channel coding, equalization and A5/1, A5/2 and A5/3 ciphering

GPRS GEA1, GEA2 and GEA3 ciphering

Programmable GSM/GPRS Modem

GSM Circuit Switch Data

GPRS Class 12

Voice Interface and Voice Front End

Two microphone inputs sharing one low noise amplifier with programmable gain and automatic gain control (AGC) mechanism

Voice power amplifier with programmable gain

2nd order Sigma-Delta A/D Converter for voice uplink path

D/A Converter for voice downlink path

Supports half-duplex hands-free operation

Compliant with GSM 03.50

3.1.4 Multi-Media Features

LCD Interface

Dedicated Serial Interface supports 1 external Serial interface for LCM

LCD Controller

Supports LCM format: RGB332, RGB444, RGB565, RGB666, RGB888

Supports LCD module with maximum resolution up to 176x220 at 16bpp

2 layer blending

Supports hardware display rotation for each layer

Audio CODEC

Wavetable synthesis with up to 64 tones

Advanced wavetable synthesizer capable of generating simulated stereo

Wavetable including GM full set of 128 instruments and 47 sets of percussions

PCM Playback and Record

Digital Audio Playback

Audio Interface and Audio Front End

Supports I2S interface

High resolution D/A Converters for Stereo Audio playback

Stereo analog input for stereo audio source

Analog multiplexer for Stereo Audio

FM Radio Recording

Stereo to Mono Conversion

3.1.5 General Description

Figure3-1-2 details the block diagram of MT6223D. on a dual-processor architecture, MT6223D integrates both an ARM7EJ-S core and 2 digital signal processor cores. ARM7EJ-S is the main processor that is responsible for running 2G and 2.5G protocol software. Digital signal processors handle the MODEM algorithms as well as advanced audio functions.

Except for some mixed-signal circuitries, the other building blocks in MT6223D are connected to either the microcontroller or one of the digital signal processors.

Specifically, MT6223D consist of the following subsystems:

- Microcontroller Unit (MCU) Subsystem - includes an ARM7EJ-S RISC processor and its accompanying memory management and interrupt handling logics.
- Digital Signal Processor (DSP) Subsystem - includes 2 DSP cores and their accompanying memory, memory controller, and interrupt controller.
- MCU/DSP Interface - where the MCU and the DSPs exchange hardware and software information.
- Microcontroller Peripherals - includes all user interface modules and RF control interface modules.
- Microcontroller Coprocessors - runs computing-intensive processes in place of Microcontroller.
- DSP Peripherals - hardware accelerators for GSM/GPRS/EGDE channel codec.
- Voice Front End - the data path for converting analog speech from and to digital speech.
- Audio Front End - the data path for converting stereo audio from stereo audio source
- Baseband Front End - the data path for converting digital signal from and to analog signal of RF modules.
- Timing Generator - generates the control signals related to the TDMA frame timing.
- Power, Reset and Clock subsystem - manages the power, reset, and clock distribution inside MT6223D
- LDOs, Power-on sequences, swicthes and SIM level shifters.

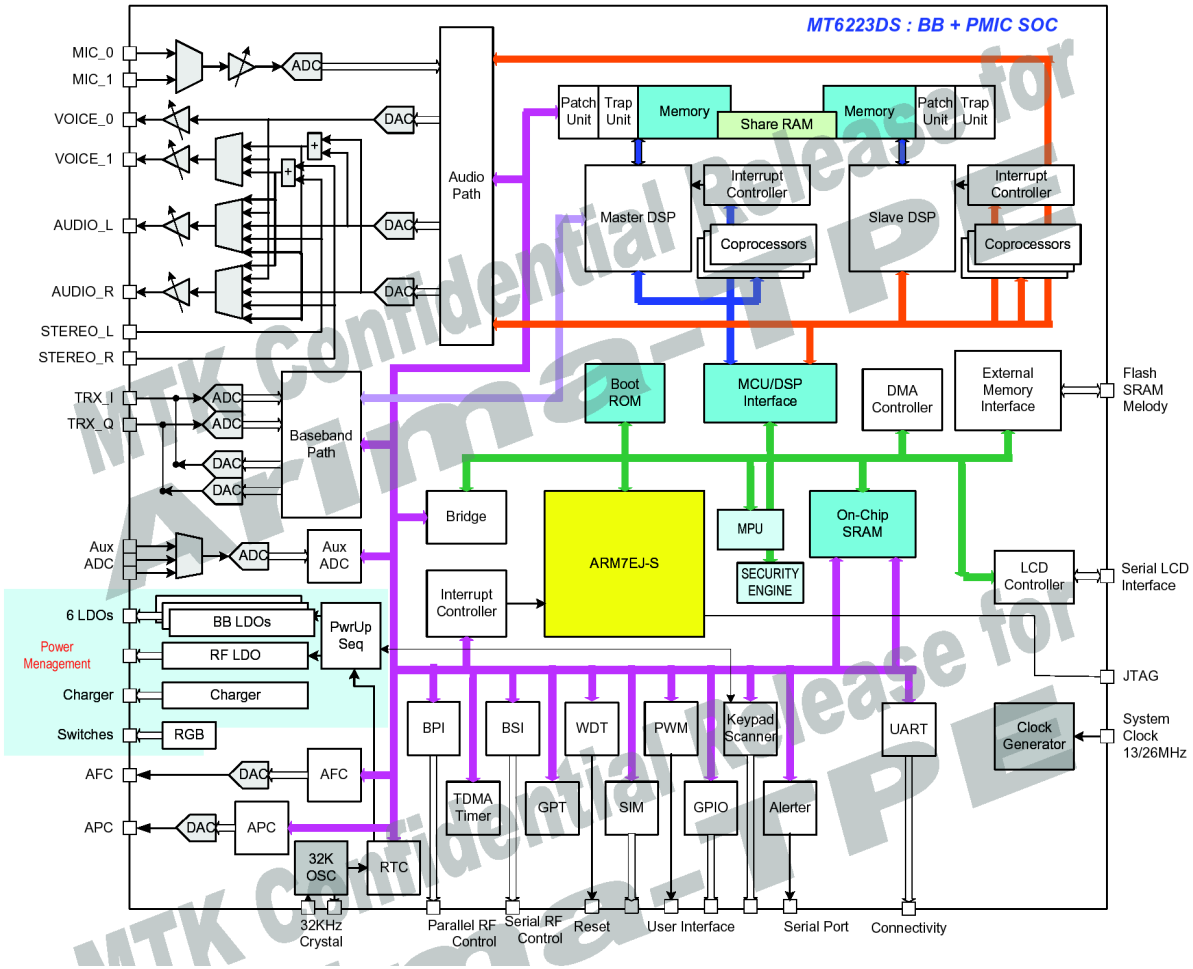

Figure.3-1-2 MT6223 BLOCK DIAGRAM

3.2 Power Amplifier Module (SKY77518)

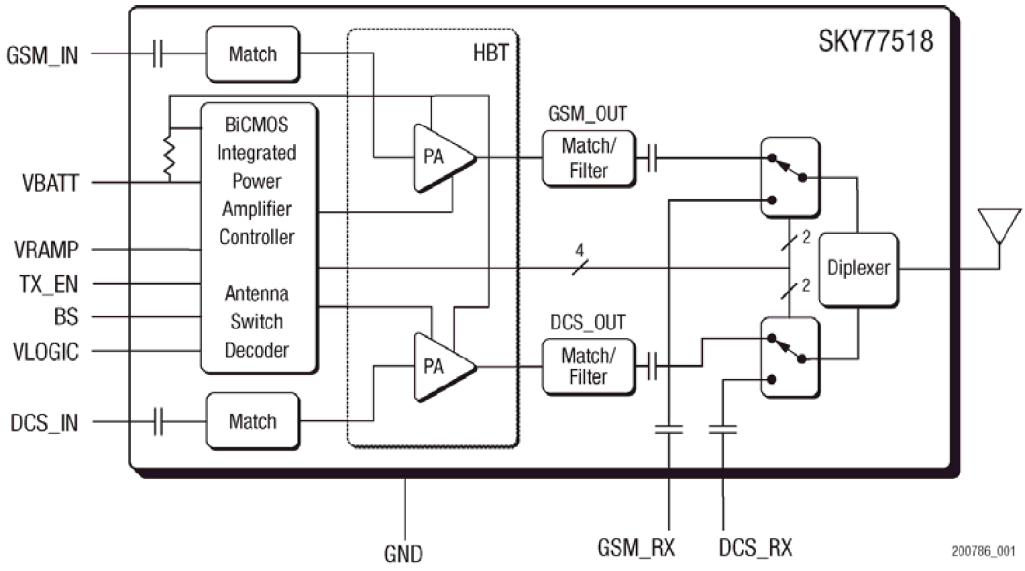

Figure.3-2-1 SKY77518 FUNCTIONAL BLOCK DIAGRAM

The SKY77518-21 is a transmit and receive front-end module (FEM) with Integrated Power Amplifier Control (iPAC.) for dual-band cellular handsets comprising GSM900 and DCS1800 operation.
Designed in a low profile, compact form factor, the SKY77518-21 offers a complete Transmit VCO-to- Antenna and Antenna-to-Receive SAW filter solution. The FEM also supports Class 12 General Packet Radio Service (GPRS) multi-slot operation.

The module consists of a GSM900 PA block and a DCS1800 PA block, impedance-matching circuitry for 50 Ω input and output impedances, TX harmonics filtering, high linearity and low insertion loss PHEMT RF switches, diplexer and a Power Amplifier Control (PAC) block with internal current sense resistor. A custom BiCMOS integrated circuit provides the internal PAC function and decoder circuitry to control the RF switches. The two Heterojunction Bipolar Transistor (HBT) PA blocks are fabricated onto a single Gallium Arsenide (GaAs) die. One PA block supports the GSM900 band and the other PA block supports the DCS1800 band. Both PA blocks share common power supply pads to distribute current. The output of each PA block and the outputs to the two receive pads are connected to the antenna pad through PHEMT RF switches and a diplexer. The GaAs die, PHEMT die, Silicon (Si) die and passive components are mounted on a multi-layer laminate substrate. The assembly is encapsulated with plastic overmold.

Band selection and control of transmit and receive modes are performed using two external control pads. Refer to the functional block diagram in Figure 3-2-1 below. The band select pad (BS) selects between GSM and DCS modes of operation. The transmit enable (TX_EN) pad controls receive or transmit mode of the respective RF switch (TX = logic 1). Proper timing between transmit enable (TX_EN) and Analog Power Control (VRAMP) allows for high isolation between the antenna and TXVCO while the VCO is being tuned prior to the transmit burst.

The SKY77518-21 is compatible with logic levels from 1.2 V to VCC for BS and TX_EN pads, depending on the level applied to the VLOGIC pad. This feature provides additional flexibility for the designer in the selection of FEM interface control logic.

3.3 Transceiver Module (AD6548)

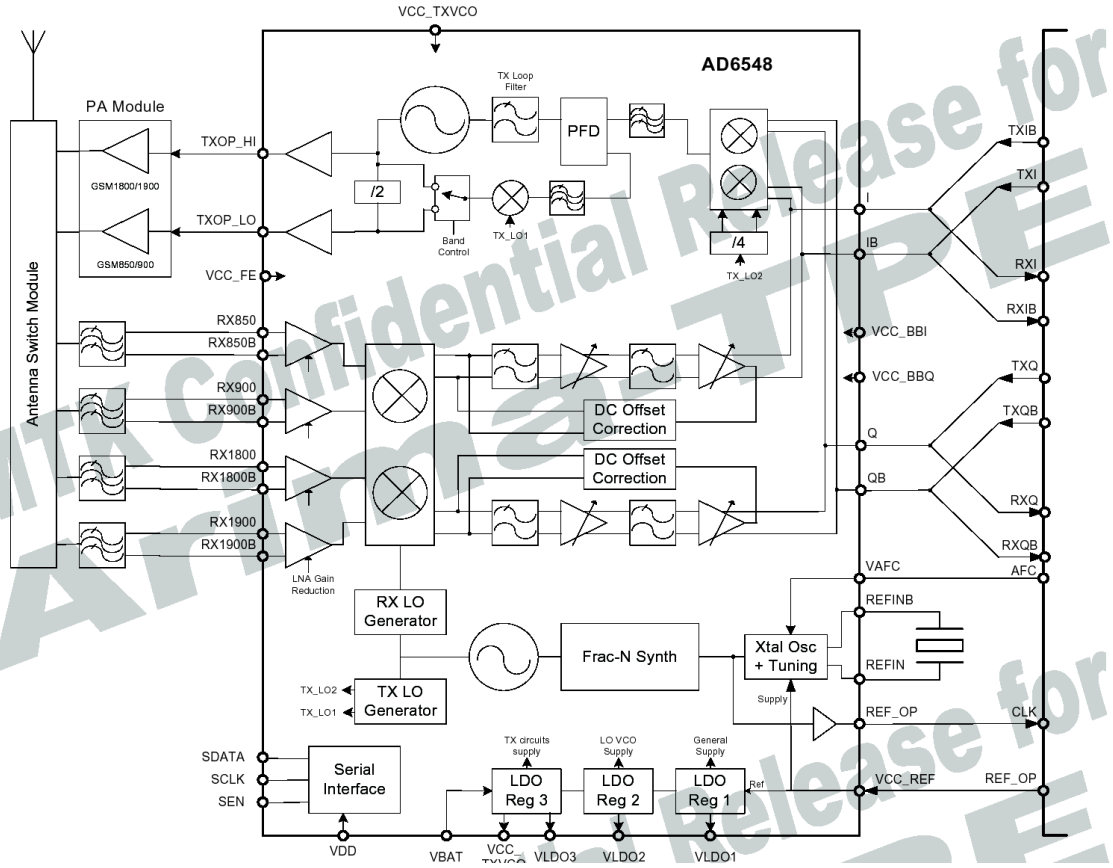

Figure.3-3-1 AD6548 FUNCTIONAL BLOCK DIAGRAM

3.3.1 General Descriptions

The AD6548/9 provides a highly integrated direct conversion radio solution that combines, on a single chip, all radio and power management functions necessary to build the most compact GSM radio solution possible. The only external components required for a complete radio design are the Rx SAWs, PA, Switchplexer and a few passives enabling an extremely small cost effective GSM Radio solution.

The AD6548/9 uses the industry proven direct conversion receiver architecture of the OthelloTM family. For Quad band applications the front end features four fully integrated programmable gain differential LNAs. The RF is then downconverted by quadrature mixers and then fed to the baseband programmable-gain amplifiers and active filters for channel selection. The Receiver output pins can be directly connected to the baseband analog processor. The Receive path features automatic calibration and tracking to remove DC offsets.

The transmitter features a translation-loop architecture for directly modulating baseband signals onto the integrated TX VCO. The translation-loop modulator and TX VCO are extremely low noise removing the need for external SAW filters prior to the PA.

The AD6548/9 uses a single integrated LO VCO for both the receive and the transmit circuits. The synthesizer lock times are optimized for GPRS applications up to and including class 12.

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To dramatically reduce the BOM both TX Translational loop and main PLL Loop Filters are fully integrated into the device.

AD6548 incorporates a complete reference crystal calibration system. This allows the external VCTCXO to be replaced with a low cost crystal. No other external components are required. The AD6549 uses the traditional VCTCXO reference source.

The AD6548/9 also contains on-chip low dropout voltage regulators (LDOs) to deliver regulated supply voltages to the functions on chip, with a battery input voltage of between 2.9V and 5.5V. Comprehensive power down options are included to minimize power consumption in normal use.

A standard 3 wire serial interface is used to program the IC. The interface features low-voltage digital interface buffers compatible with logic levels from 1.6V to 3.0V.

The AD6548/9 is packaged in a 5mm × 5mm , 32-lead LFCSP package.

ORDERING GUIDE	Model TemperatureRange	Package
AD6548BCPZ	-20℃ to +85℃	LFCSP-32
AD6549BCPZ	-20℃ to +85℃	LFCSP-32

3.3.2 Features

Fully Integrated GSM Transceiver including

Direct Conversion Receiver

4 Differential LNAs

Integrated Active RX Channel Select Filters

Programmable Gain Baseband Amplifiers

Translation Loop Direct VCO Modulator

Integrated TX VCO and tank

External TX filters eliminated

Integrated Loop filter components

High performance multi band PLL system

Fast Fractional-N Synthesizer

Integrated Local Oscillator VCO

Fully Integrated Loop filters

Crystal Reference Oscillator & Tuning System (AD6548)

Power Management

Integrated LDOs allow direct battery supply connection

Small footprint

32-Lead 5 X 5 mm Chipscale Package

APPLICATIONS

Dual, Triple and Quad Band Radios

- GSM850, E-GSM 900, DCS1800 and PCS1900
- GPRS to Class 12- EDGE RX

3.3.3 Pin Descriptions

No	Name	Description	No	Name	Description
1	VCC_FE	Front end supply (IP)[3]	17	VCC_REF	Reference Oscillator Supply (IP)
2	I	I baseband input/output	18	VAFC	AD6548 Crystal Freq control (IP) AD6549: Connect to VCC_REF
3	IB	I baseband input/output	19	REFINB	Crystal / VCTCXO Connection
4	VCC_BBI	Baseband I, TX path supply (IP)[3]	20	REFIN	Crystal Connection
5	SDATA	Serial port data	21	REF_OP	Reference Frequency Output
6	SCLK	Serial port clock	22	QB	Q baseband input/output
7	SEN	Serial port enable	23	Q	Q baseband input/output
8	N/C	Not connected	24	VCC_BBQ	Baseband Q supply (IP)[3]
9	VLDO3	TX LDO Output[1]	25	RX1900B	PCS 1900 LNA input
10	TXOP_LO	Transmit O/P (850/900MHz)	26	RX1900	PCS 1900 LNA input
11	TXOP_HI	Transmit O/P (1800/1900MHz)	27	RX1800B	DCS 1800 LNA input
12	VCC_TXVCO	TX VCO supply (1)	28	RX1800	DCS 1800 LNA input
13	VDD	Serial interface supply	29	RX900B	E-GSM 900 LNA input
14	VBAT	Battery I/P for LDO reg's	30	RX900	E-GSM 900 LNA input
15	VLDO1	LDO regulator Output[2]	31	RX850B	GSM 850 LNA input
16	VLDO2	LO VCO Supply[1]	32	RX850	GSM 850 LNA input

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3.4 Memory Module (TV00570002CDGB)

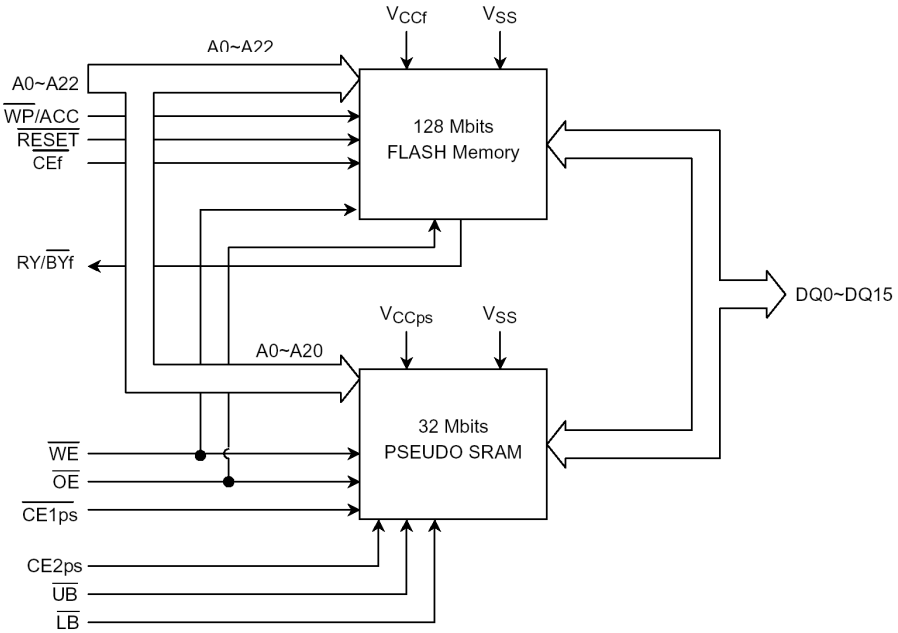


Figure.3-4-1 TV00570002CDGB FUNCTIONAL BLOCK DIAGRAM

DESCRIPTION

The TV00570002/003CDGB is a mixed multi-chip package containing a 33,554,432-bit pseudo static RAM and a 134,217,728-bit Nor Flash Memory. The TV00570002/003CDGB is available in a 81-pin BGA package making it suitable for a variety of applications.

MCP Features

· Power supply voltage of 2.7 to 3.3 V

· Operating temperature of .30° to 85℃

· Package

P-TFBGA81-0710-0.80BZ (Weight: 0.15 g)

Pseudo SRAM Features

· Organization : 2M × 16 bits

· Power dissipation

Operating : 40 mA maximum

Standby : 150 μA maximum

Deep power-down standby : 5 μA maximum

· Access time :

Random / Page : 70 ns / 30 ns @CL=30pF

· Page read operation by 8 words

· Deep power-down mode : Memory cell data invalid

Nor Flash Memory Features

· Organization: 8M × 16 bits

· Power dissipation

Read operating :	55 mA maximum
Address Increment Read operation:	24 mA maximum
Page Read operating :	5 mA maximum
Program / Erase operating:	15 mA maximum
Standby :	10 µA maximum

· Access time :
Random : 70 ns @CL=30pF
Page : 25 ns @CL=30pF

· Functions

Simultaneous Read/Write
Page read
Auto-Program , Auto Page Program
Auto Block Erase , Auto Chip Erase
Program Suspend / Resume
Erase Suspend/Resume
Data polling / Toggle bit
Password block protection
Block Protection/Boot Block Protection
Automatic Sleep, supports for hidden ROM Area
Common Flash Memory Interface (CFI)

· Block erase architecture

8 × 8 Kbytes / 127 × 64 Kbytes

· Bank architecture

16 Mbits × 8 Banks

· Boot block architecture

TV00570002CDGB : top boot block
TV00570003CDGB : bottom boot block

· Mode control

Compatible with JEDEC standard commands

· Erase/Program cycles

100,000 cycles typ.

PIN ASSIGNMENT (TOP VIEW)

	1	2	3	4	5	6	7	8
A	NC							NC
B	NC	NC	NC	NC	NC	NC	NC	NC
C	NC	A7	$\overline{LB}$	$\overline{WP}$/ACC	$\overline{WE}$	A8	A11	
D	A3	A6	$\overline{UB}$	$\overline{RESET}$	CE2ps	A19	A12	A15
E	A2	A5	A18	RY/ $\overline{BY}$f	A20	A9	A13	A21
F	A1	A4	A17	NC	NC	A10	A14	A22
G	A0	V_{SS}	DQ1	NC	NC	DQ6	NC	A16
H	$\overline{CEf}$	$\overline{OE}$	DQ9	DQ3	DQ4	DQ13	DQ15	NC
J	$\overline{CE1ps}$	DQ0	DQ10	V_{CCf}	V_{CCps}	DQ12	DQ7	V_{SS}
K		DQ8	DQ2	DQ11	NC	DQ5	DQ14	
L	NC	NC	NC	NC	NC	NC	NC	NC
M	NC							NC

PIN NAMES

A0 to A22	Address inputs
DQ0 to DQ15	Data inputs / outputs
$\overline{CE1ps}$, CE2ps	Chip enable inputs for Pseudo SRAM
$\overline{CEf}$	Chip enable inputs for Nor Flash Memory
$\overline{OE}$	Output enable input
$\overline{WE}$	Write enable input
$\overline{LB}$, $\overline{UB}$	Data byte control inputs for Pseudo SRAM
$\overline{WP}$/ACC	Write protect /program acceleration input for Nor Flash Memory
$\overline{RESET}$	Hardware reset input for Nor Flash Memory
RY/ $\overline{BY}$f	Ready/Busy output for Nor Flash Memory
V_{CCps}	Power supply for Pseudo SRAM
V_{CCf}	Power supply for Nor Flash Memory
V_{SS}	Ground
NC	Not connected

3.5 FM Radio Module (Si4708)

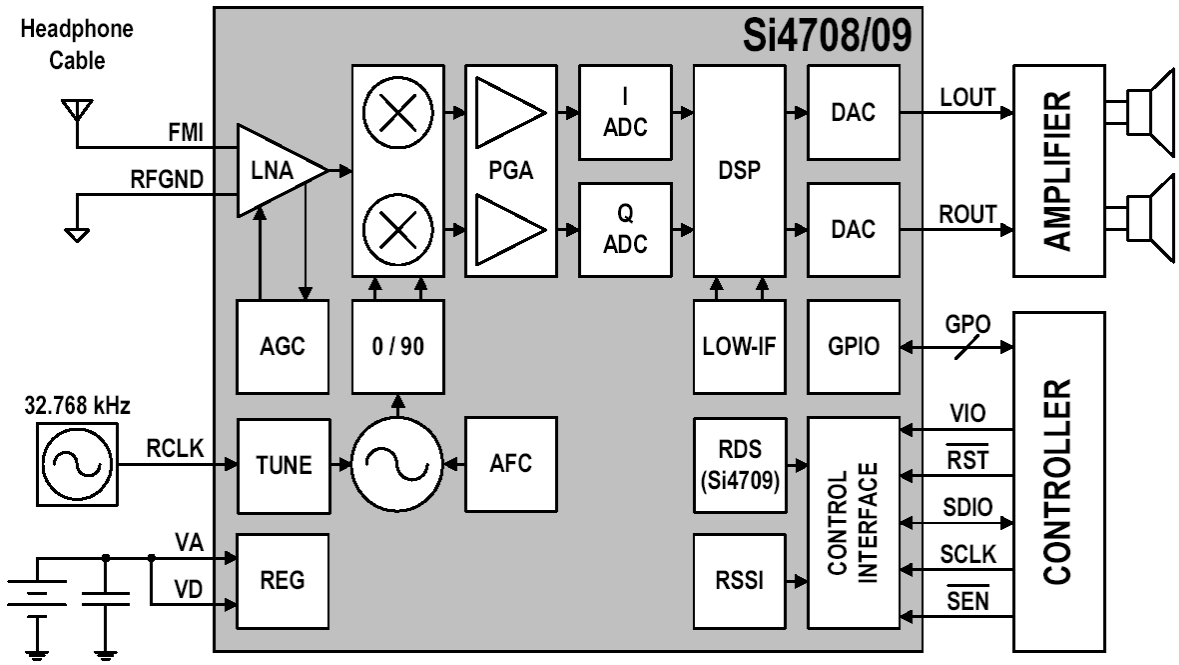


Figure. 3-5-1 Si4708 FM Receiver Block Diagram

The Si4708/09 extends Silicon Laboratories Si4700 FM tuner family, and further increases the ease and attractiveness of adding FM radio reception to mobile devices through small size and board area, minimum component count, flexible programmability, and superior, proven performance. Si4708/09 software is backwards compatible to existing Si4700/01/02/03 FM Tuner designs and leverages Silicon Laboratories' highly successful and patented Si4700/01/02/03 FM tuner. The Si4708/09 benefits from proven digital integration and 100% CMOS process technology, resulting in a completely integrated solution. It is the industry's smallest footprint FM tuner IC requiring only 6.25 mm2 board space and one external bypass capacitor.

The device offers significant programmability, catering to the subjective nature of FM listeners' audio preferences and variable FM broadcast environments worldwide.

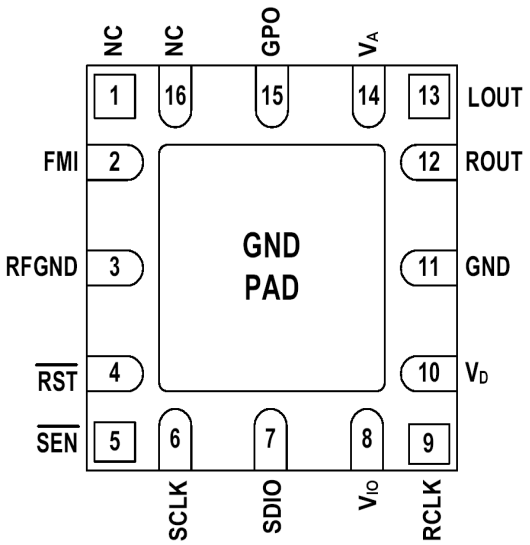
The Si4709 incorporates a digital processor for the European Radio Data System (RDS) and the US Radio Broadcast Data System (RBDS) including all required symbol decoding, block synchronization, error detection, and error correction functions.

RDS/RDBS* enables data such as station identification and song name to be displayed to the user. The Si4709 offers a detailed RDS view and a standard view, allowing adopters to selectively choose granularity of software is backwards compatible to the proven Si4701/03, adopted by leading cell-phone and MP3 manufacturers world-wide.

The Si4708/09 is based on the superior, proven performance of Silicon Laboratories' Aero architecture offering unmatched interference rejection and leading sensitivity. The device uses the same programming interface as the Si4700/01/02/03 and supports multiple bus modes. Power

management is simplified with an integrated regulator allowing direct connection to a 2.7 to 5.5 V battery for VD and 2.7 to 5.5 V battery for VA.

The Si4708/09 device's high level of integration and complete FM system production testing increases quality to manufacturers, improves device yields, and simplifies device manufacturing and final testing.



Top View

Pin Number(s)	Name	Description
1, 16	NC	No Connect. Leave floating.
2	FMI	FM RF inputs.
3	RFGND	RF ground. Connect to ground plane on PCB.
4	$\overline{RST}$	Device reset input (active low).
5	$\overline{SEN}$	Serial enable input (active low).
6	SCLK	Serial clock input.
7	SDIO	Serial data input/output.
8	V_{IO}	I/O supply voltage.
9	RCLK	External reference oscillator input.
10	V_D	Digital supply voltage. May be connected directly to battery.
11, PAD	GND	Ground. Connect to ground plane on PCB.
12	ROUT	Right audio output.
13	LOUT	Left audio output.
14	V_A	Analog supply voltage. May be connected directly to battery.
15	GPO	General purpose input/output.

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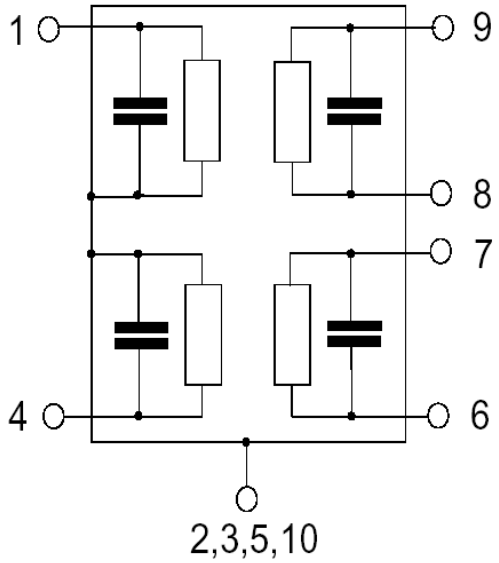
3.6 Antenna Switch Module (B9310)



Application

Low-loss 2in1 RF filter for mobile telephone GSM 850 and GSM 1900 systems, receive path (Rx)

Usable passband:

Filter 1 (GSM 1900): 60 MHz

Filter 2 (GSM 850): 25 MHz

Unbalanced to balanced operation for both filters

Impedance transformation from 50 W to 150 W for both filters

Suitable for GPRS class 1 to 12

Features

Package size 2.0 x1.6 x 0.68 mm3

Package code QCS10H

RoHS compatible

Approx. weight 0.008g

Package for Surface Mount Technology (SMT)

Ni, gold-plated terminals

Pin configuration

1	Input [Filter 1]
4	Input [Filter 2]
6,7	Output, balanced [Filter 2]
8,9	Output, balanced [Filter 1]
2,3,5,10	Case-ground

3.7 LCD Interface

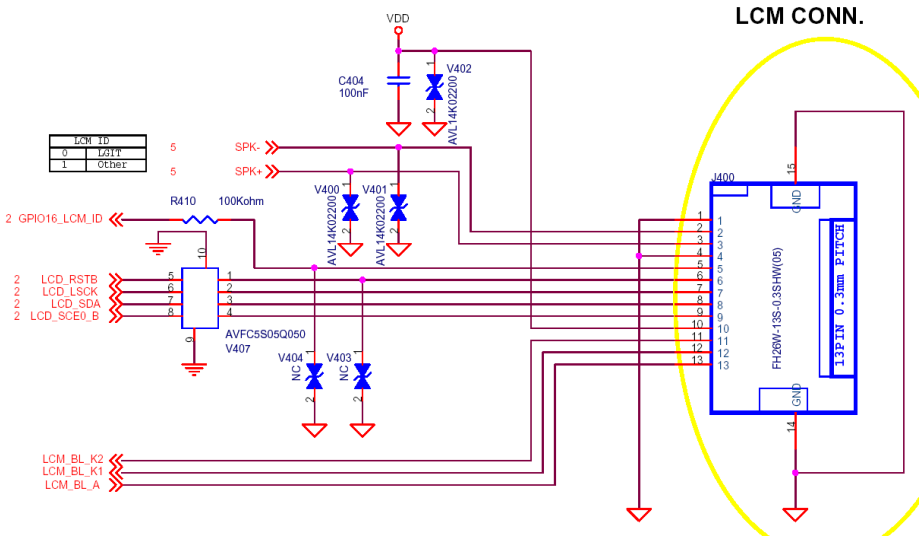


Figure.3-7-1 LCD Interface

The IM152FBN7A model is a Color TFT (Main) LCD supplied by LG Innotek.

This main LCD has a 1.52 inch diagonally measured active display area with 128(RGB)X128 resolution.

Each pixel is divided into Red, Green and Blue sub-pixels and dots which are arranged in vertical stripes.

Main LCD color is determined with 262,144 colors signal for each pixel.

The IM152FBN7A has been designed to apply the interface method that enables low power, high speed, and high contrast.

The IM152FBN7A is intended to support applications where thin thickness, wide viewing angle and low power consumption are critical factors and graphic displays are important.

Pin Description

Pin No.	Symbol	Description	Remark
1	GND	-	Ground
2	SPK-	-	SPEAKER -
3	SPK+	-	SPEAKER +
4	GND	-	Ground
5	MAKER_ID(Low)	I	Distinction of LCD maker (LGIT: Low)
6	RESET/	I	Reset Pin. Initialize the LSI at the low level
7	SCL	-	Serial Clock
8	SDI	I	Serial Data
9	CS	I	Chip_Select
10	VCC	I	Power Supply for internal analog regulator circuits
11	MLED_C1	O	LED1 Cathode Connection
12	MLED_C2	O	LED2 Cathode Connection
13	MLED_A	I	Power Supply for LED (Anode)

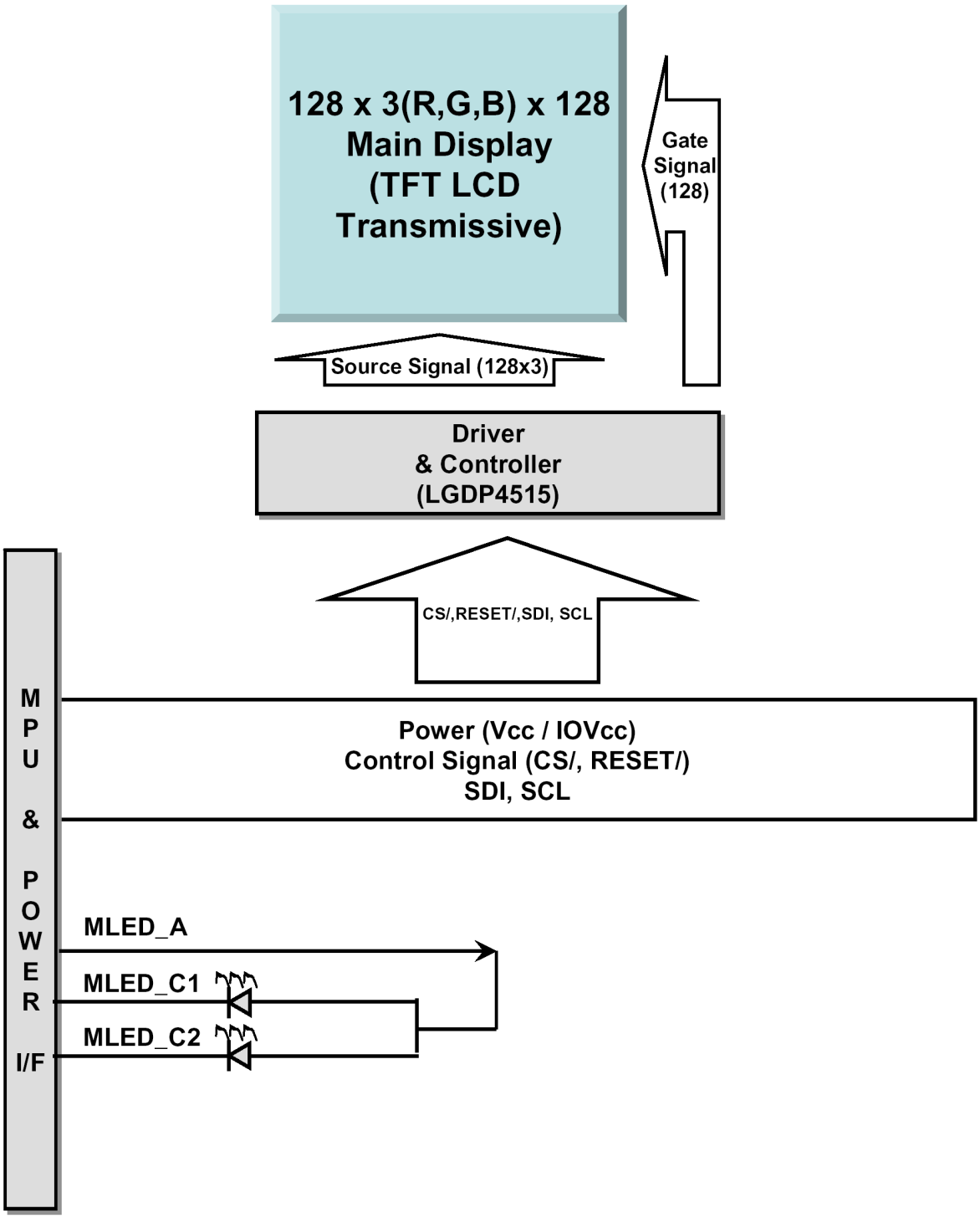


Figure. 3-7-2 IM152FBN6A Block Diagram

3.8 SIM Card Interface

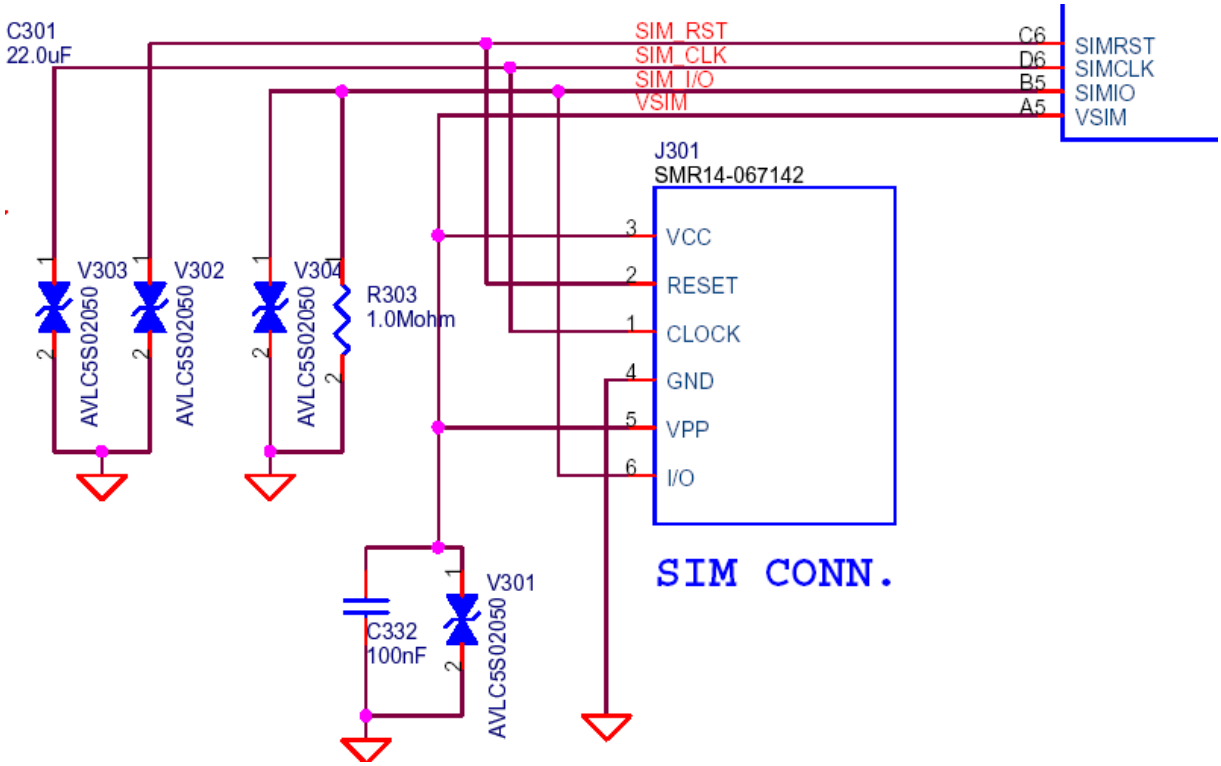


Figure.3-8-1 SIM CARD Interface

The MT6223 contains a dedicated smart card interface to allow the MCU access to the SIM card. It can operate via 4terminals, using SIMVCC, SIMI/O, SIMRST, SIMCLK

The SIMVCC is used to control the external voltage supply to the SIM card. SIMRST is used as the SIM card reset signal. SIMI/O and SIMCLK are used for data exchange purpose.

The SIM interface acts as a half duplex asynchronous communication port and its data format is composed of ten consecutive bits: a start bit in state Low, eight information bits, and a tenth bit used for parity checking.

3.9 KEYPAD Interface

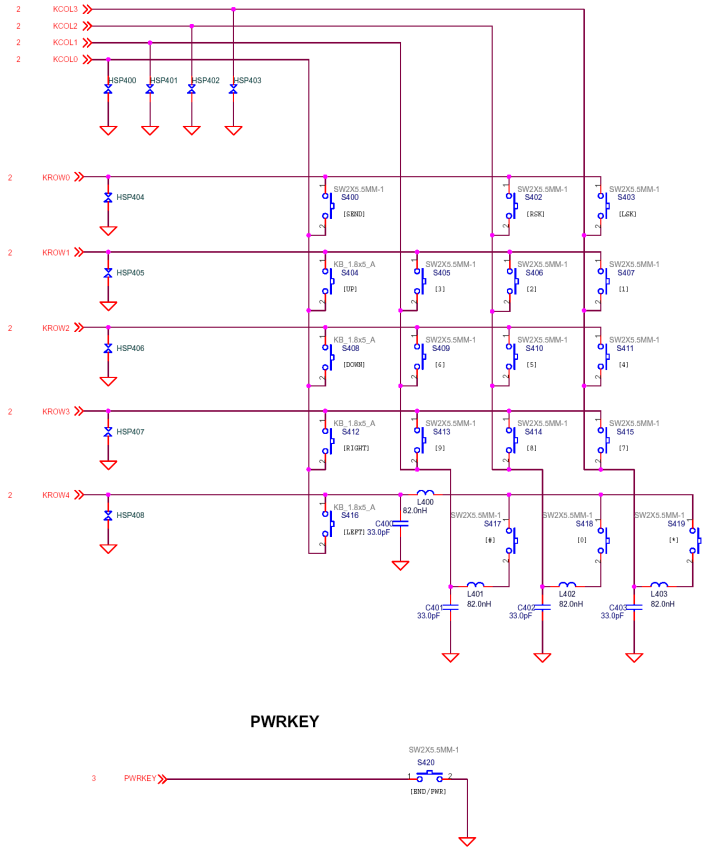


Figure.3-9-1. KEYPAD Interface

The keypad can be divided into two parts: one is the keypad interface including 4 columns and 5 rows; the other is the key detection block which provides key pressed, key released and de-bounce mechanisms. Each time the key is pressed or released, i.e. something different in the 4 x 5 matrix, the key detection block senses the change and recognizes if a key has been pressed or released. Whenever the key status changes and is stable, a KEYPAD IRQ is issued.

The MT6223 can then read the key(s) pressed directly in KP_HI_KEY, KP_MID_KEY and KP_LOW_KEY registers. To ensure that the key pressed information is not missed, the status register in keypad is not read-cleared by APB read command. The status register can only be changed by the key-pressed detection FSM.

3.10 Battery Charging Block Interface

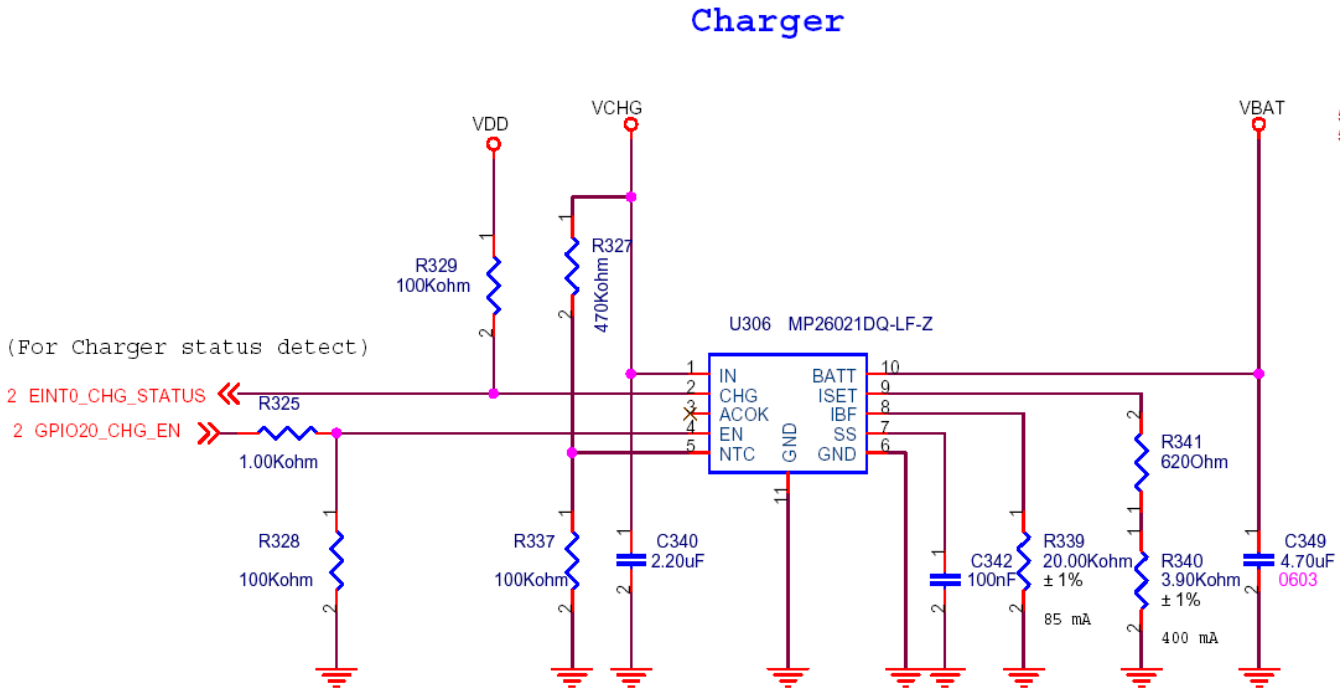


Figure.3-10-1 Charging IC Interface

The MP26021 is controlled by MT6223.

3.11 Audio Interface

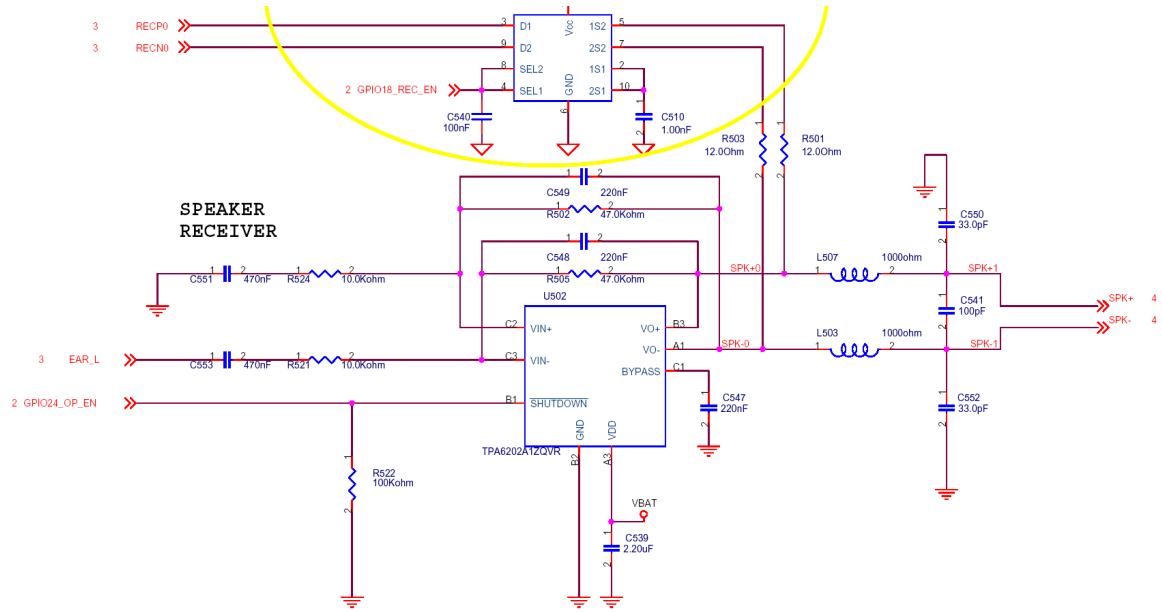


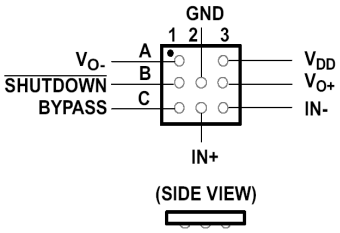
Figure.3-11-1 Audio Interface

The TPA6202A1 is a 1.25W mono amplifier designed to drive a speaker with at least 8-Ω. impedance while consuming less than 37 mm2 (ZQV package option) total printed-circuit board (PCB) area in most applications. This device operates from 2.5V to 5.5V, drawing only 1.7mA of quiescent supply current.

The TPA6202A1 is available in the space-saving 2 mm x 2 mm MicroStar Junior™ BGA package.

A fast start-up time of 4ms with minimal pop makes the TPA6202A1 ideal for wireless handsets.

MicroStar Junior™ (ZQV) PACKAGE
(TOP VIEW)



(SIDE VIEW)

Terminal Functions

TERMINAL		I/O	DESCRIPTION
NAME	ZQV		
BYPASS	C1	I	Mid-supply voltage. Adding a bypass capacitor improves PSRR.
GND	B2	I	High-current ground
IN-	C3	I	Negative differential input
IN+	C2	I	Positive differential input
$\overline{\text{SHUTDOWN}}$	B1	I	Shutdown terminal (active low logic)
V_{DD}	A3	I	Supply voltage terminal
V_{O+}	B3	O	Positive BTL output
V_{O-}	A1	O	Negative BTL output
Thermal Pad	N/A		Connect to ground. Thermal pad must be soldered down in all applications to properly secure device on the PCB.

3.12 Vibrator Interface

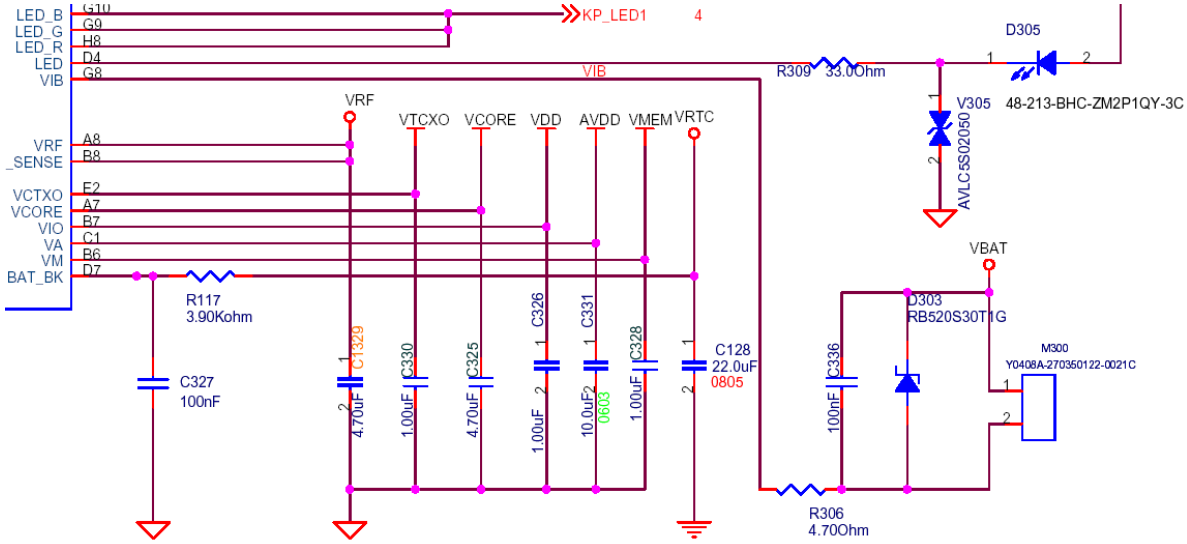
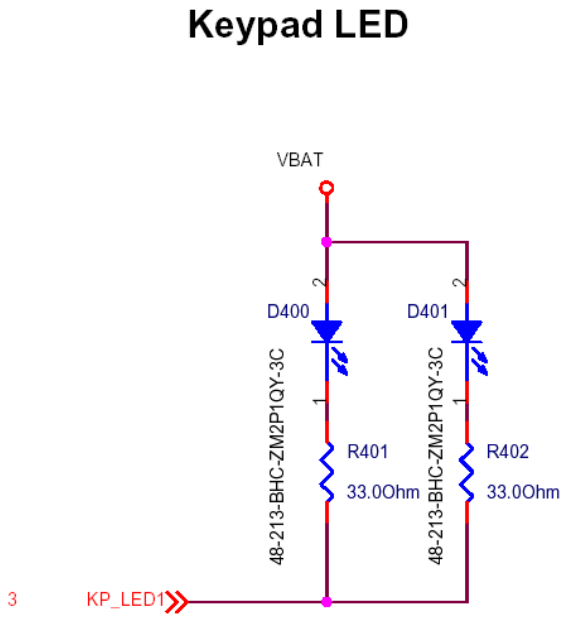


Figure.3-12-1Vibrator Interface

This handset has Vibrator operation. Control signal is controlled by MT6223.

3.13 Key LED Interface



This handset has 2 LEDs that illuminates white color.

Control signal is controlled by MT6223 and handset has 3 methods, ON, OFF, Dimming

4.Trouble Shooting

Base Band Trouble shooting

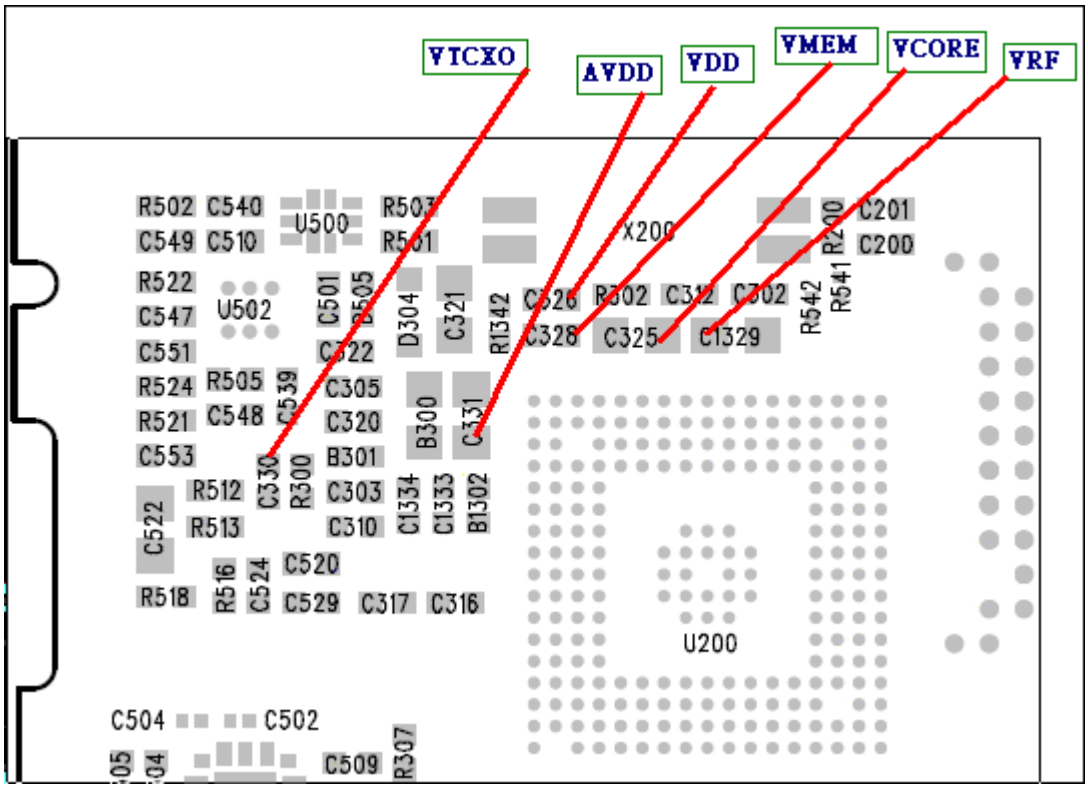
4.1 Power On Trouble

Test Point

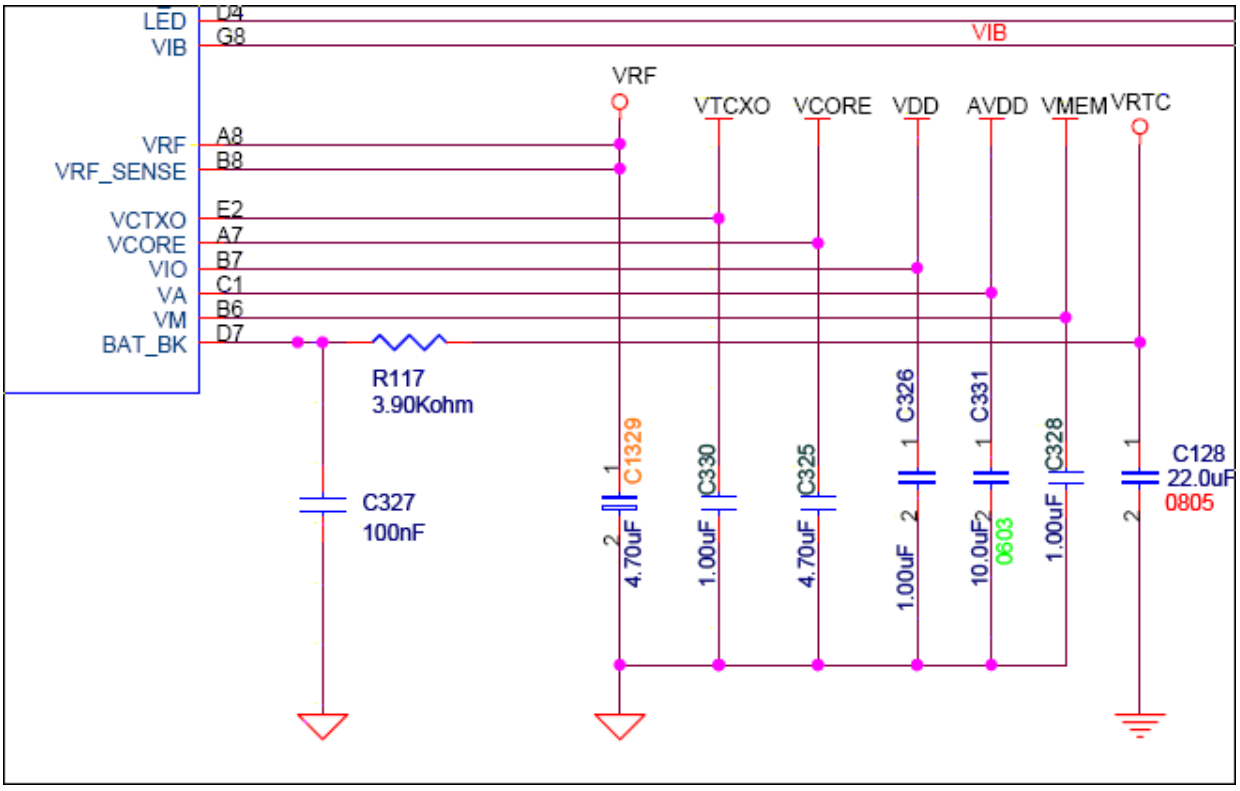
Check Points :

- Battery Voltage(Need to over 3.35V)
- Power-On key detection(PWRON signal)

	Voltage	Measure pin	PART
VRF	2.8V	C1329 Pin1	TP1
VTCXO	2.8V	C330 Pin1	TP2
VCORE	1.8V	C325 Pin1	TP3
VDD	2.8V	C326 Pin1	TP4
AVDD	2.8V	C331 Pin1	TP5
VMEM	2.8V	C328 Pin1	TP6
VRTC	2.7V	C128 Pin1	TP7



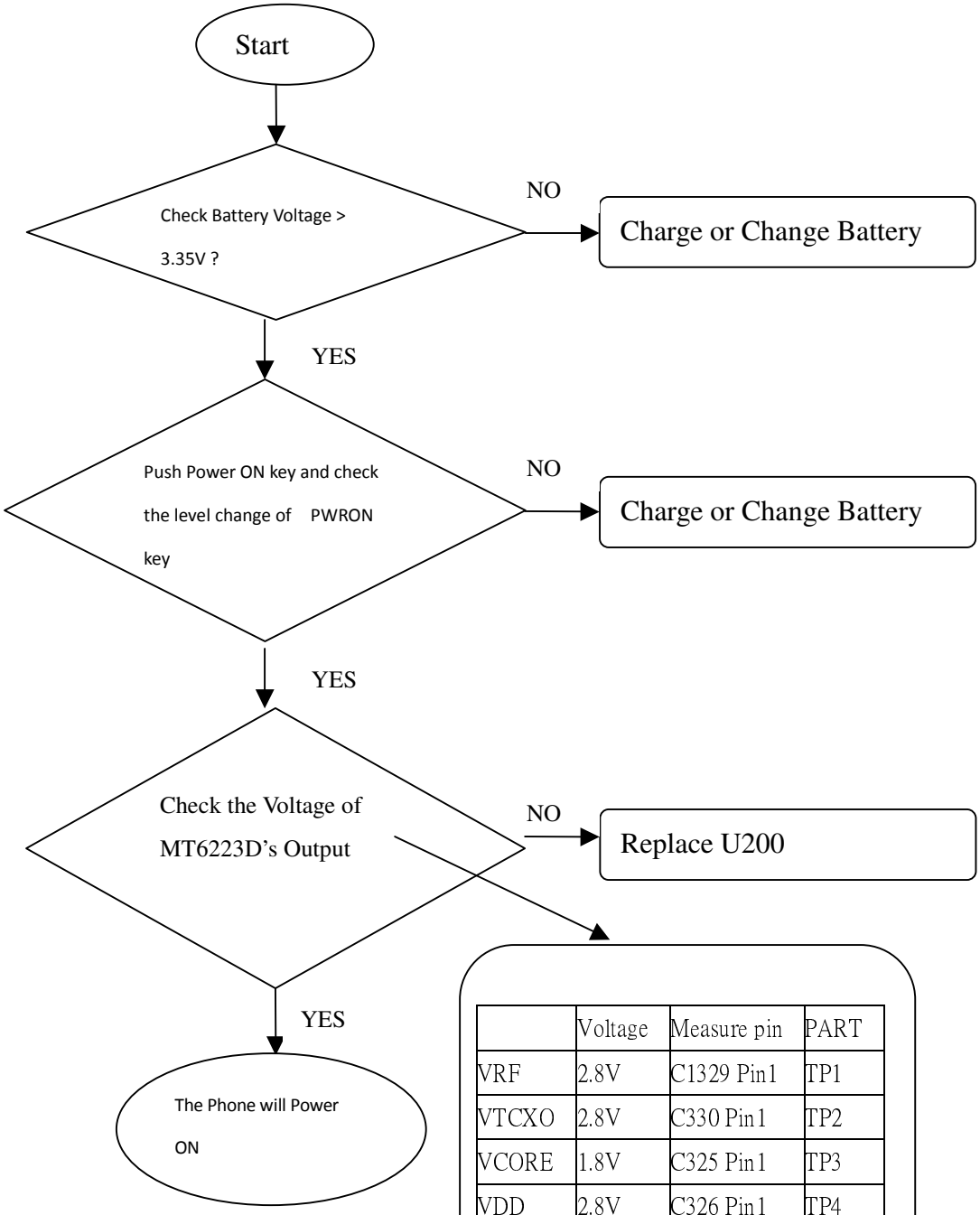
Circuit Diagram



References voltage:

VSIM	1.8V/3.3V
VRF	2.8V
VCORE	1.8V/1.5V
VIO	2.8V
VMEM	1.8V/2.8V
VA	2.8V
VCTX0	2.8V

Checking Flow

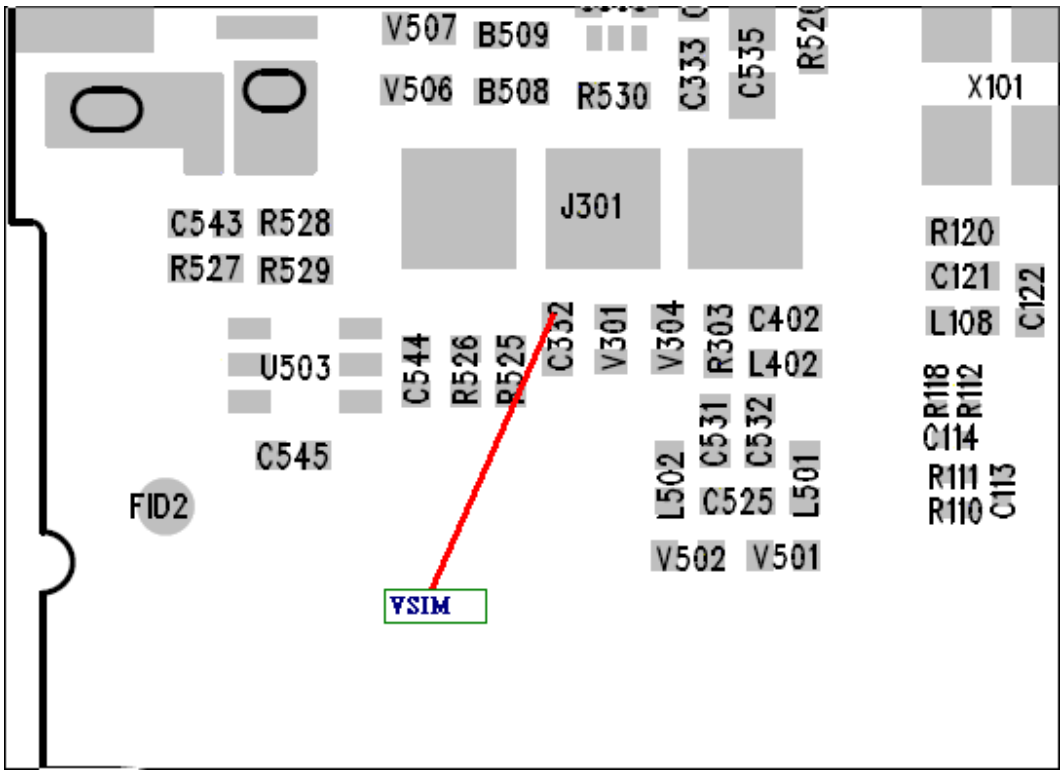


	Voltage	Measure pin	PART
VRF	2.8V	C1329 Pin1	TP1
VTCXO	2.8V	C330 Pin1	TP2
VCORE	1.8V	C325 Pin1	TP3
VDD	2.8V	C326 Pin1	TP4
AVDD	2.8V	C331 Pin1	TP5
VMEM	2.8V	C328 Pin1	TP6
VRTC	2.7V	C128 Pin1	TP7

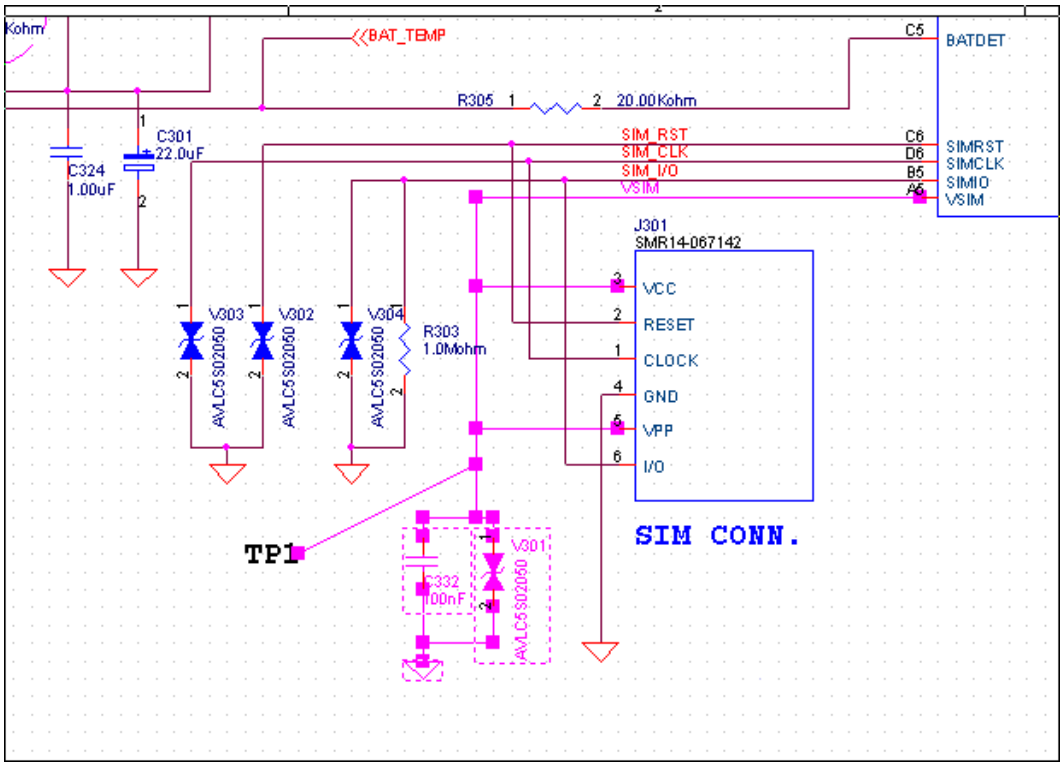
4.2 SIM Card Trouble

Test Point

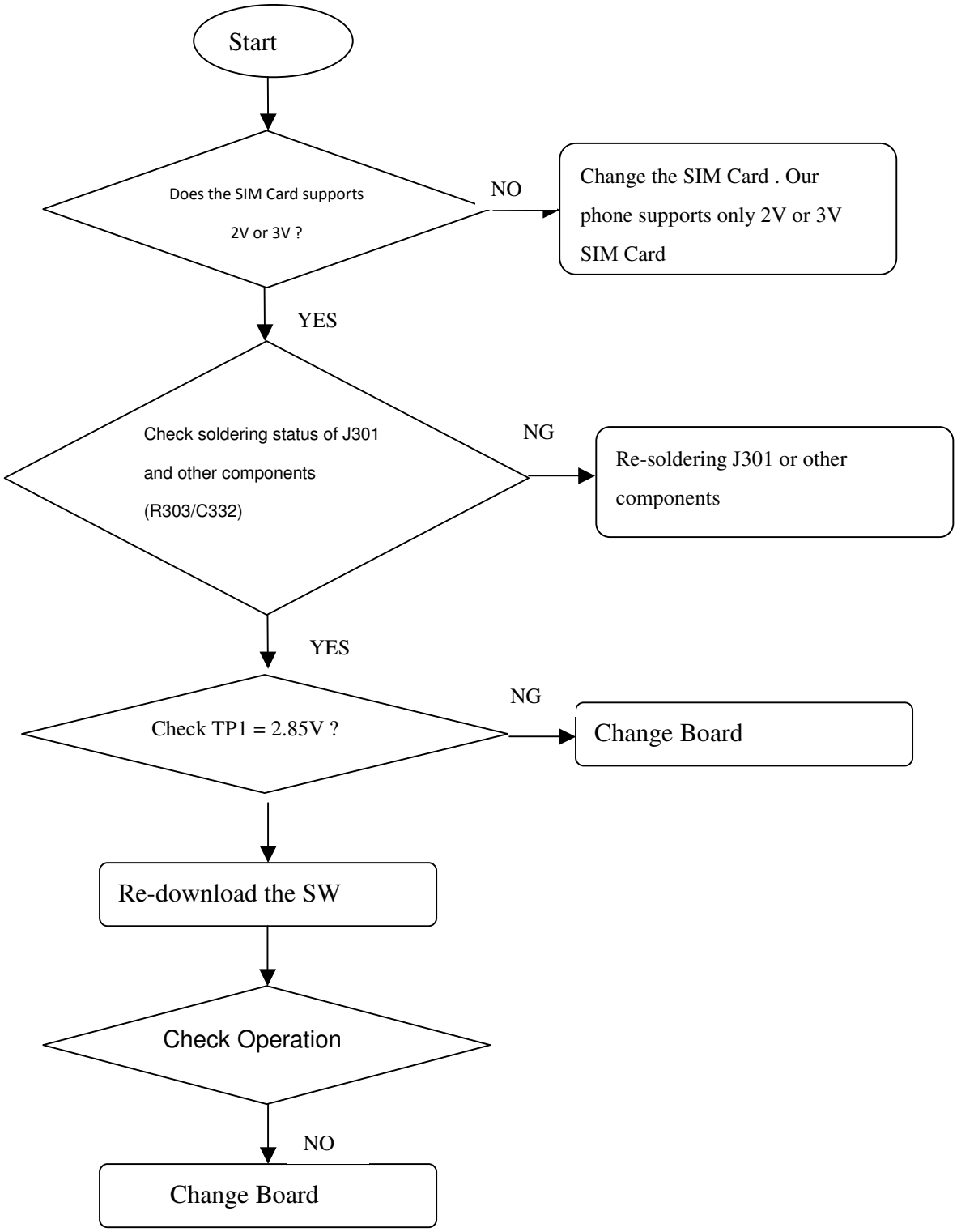
		Measure pin	PART
VSIM		C332 Pin1	TP1



Circuit Diagram



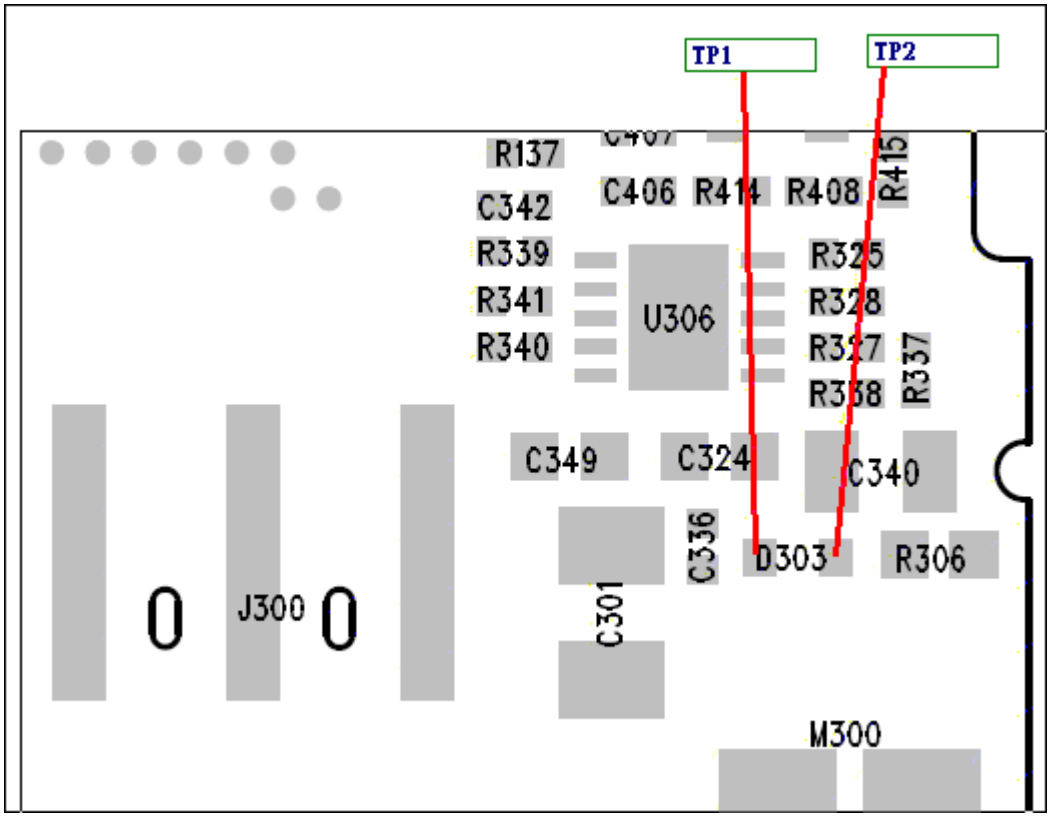
Checking Flow



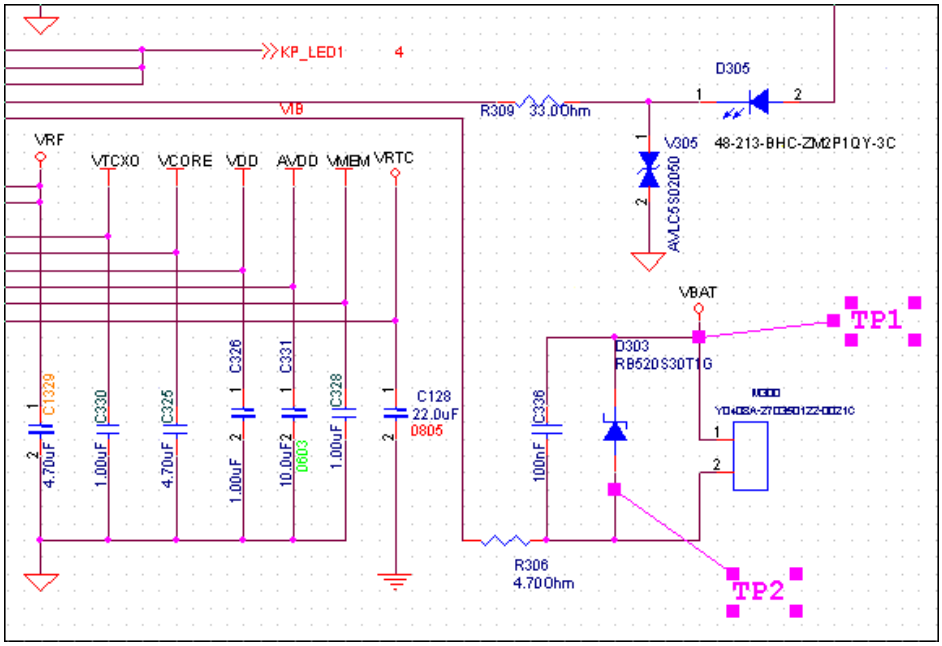
4.3 Vibrator Trouble

Test Point

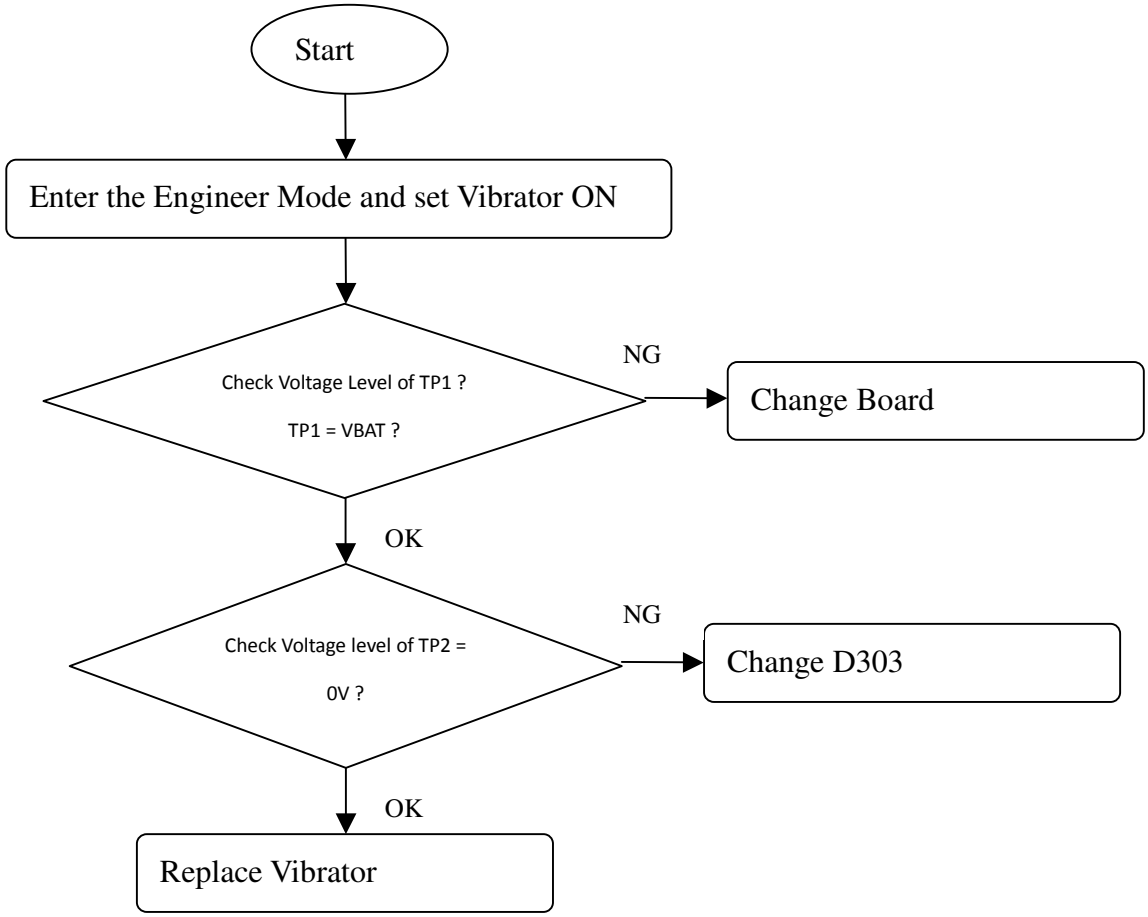
		Measure pin	PART
VBAT		D303 Pin2	TP1
		D303 Pin1	TP2



1.3.1 Circuit Diagram

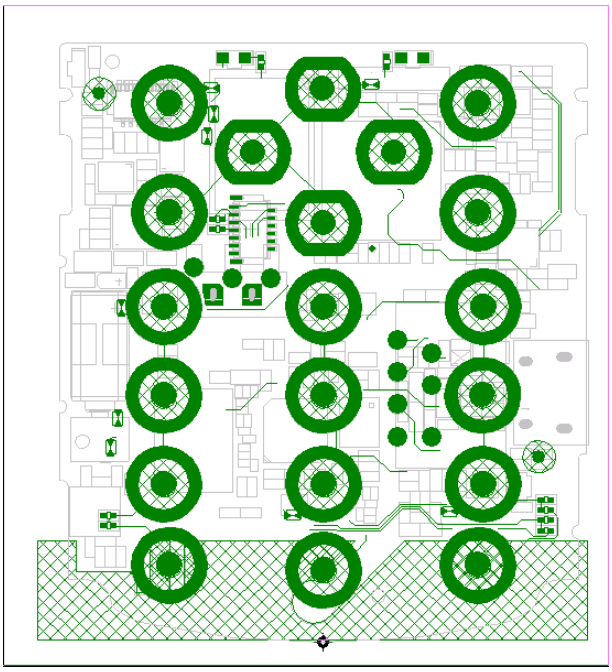


Checking Flow

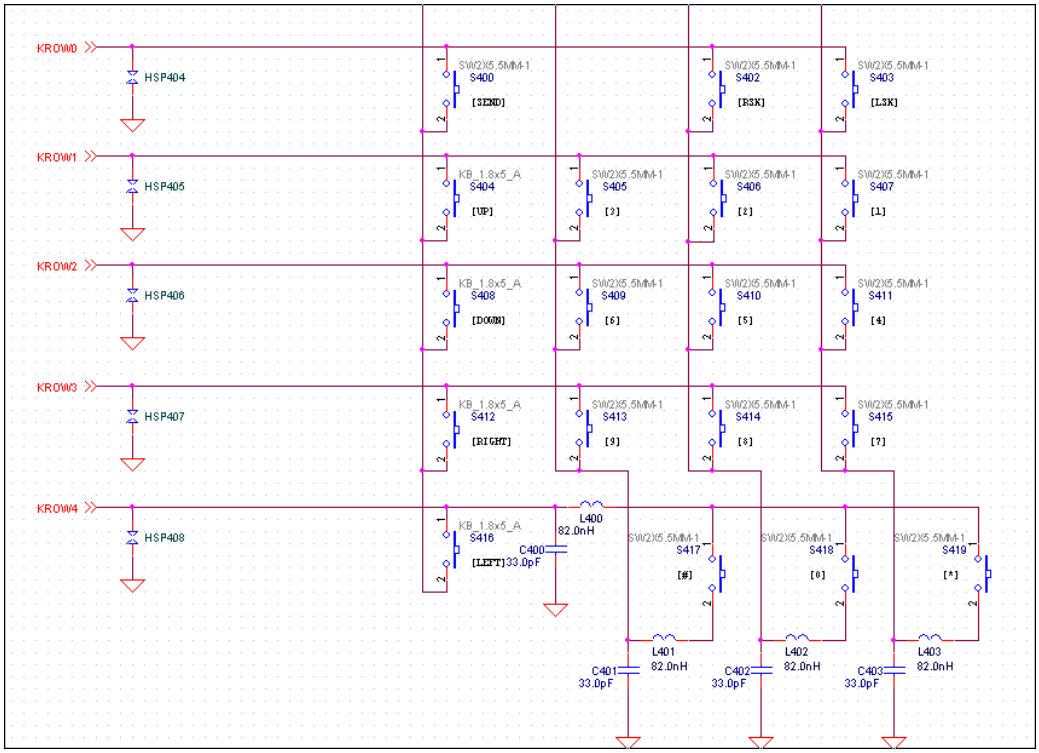


4.4 Keypad Trouble

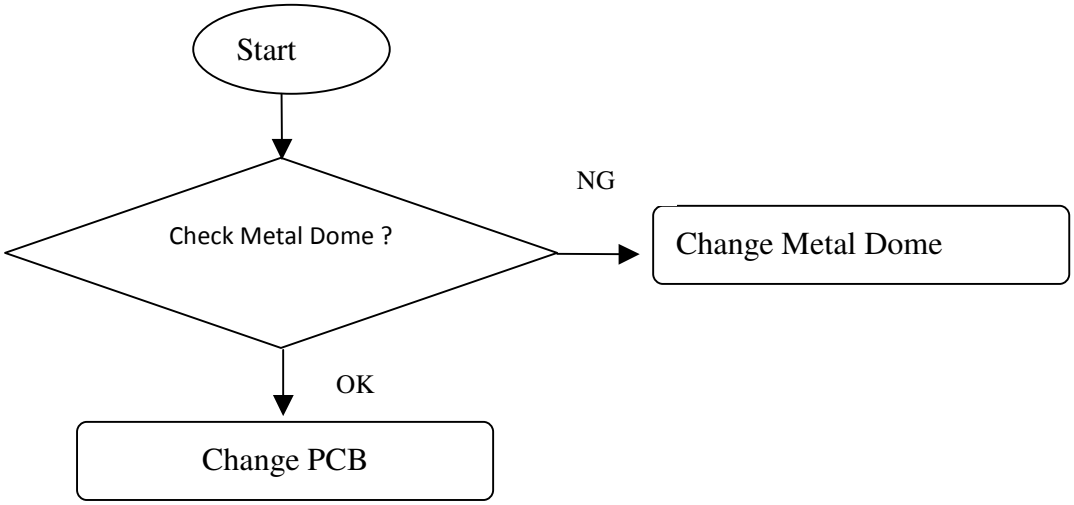
Test Point



Circuit Diagram



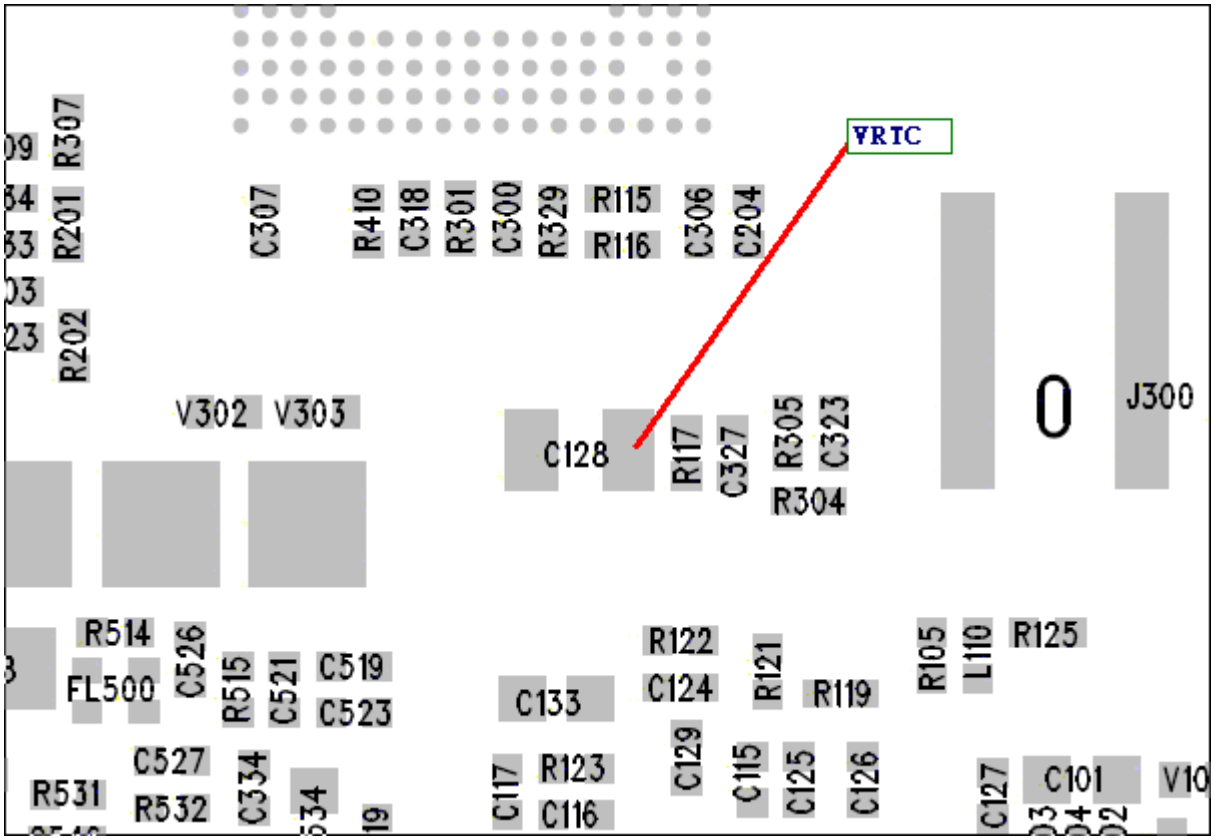
Checking Flow



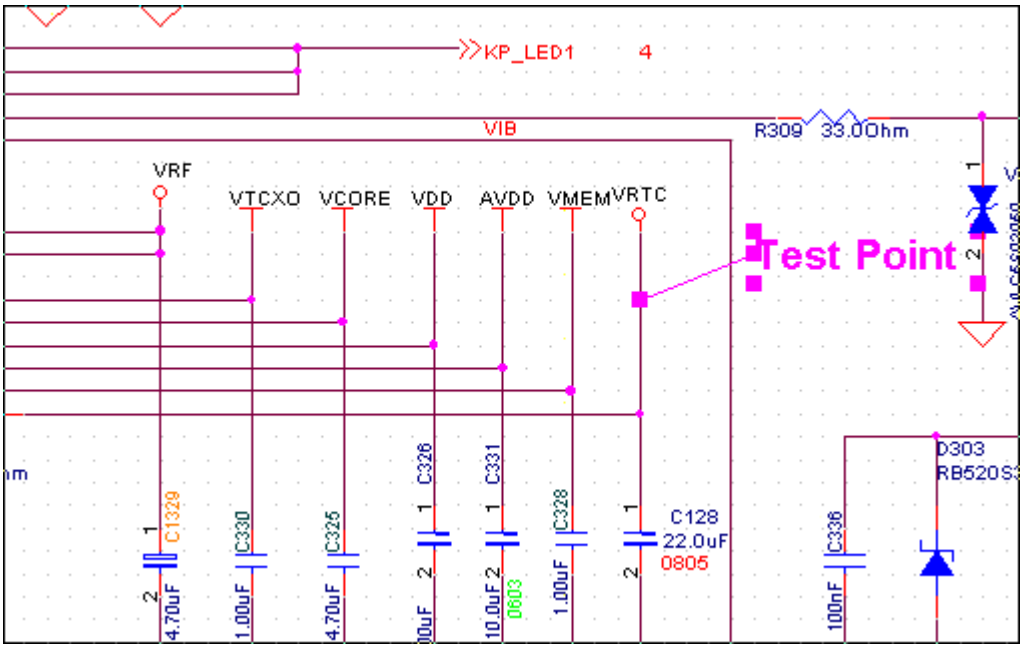
4.5 RTC Trouble

Test Poin

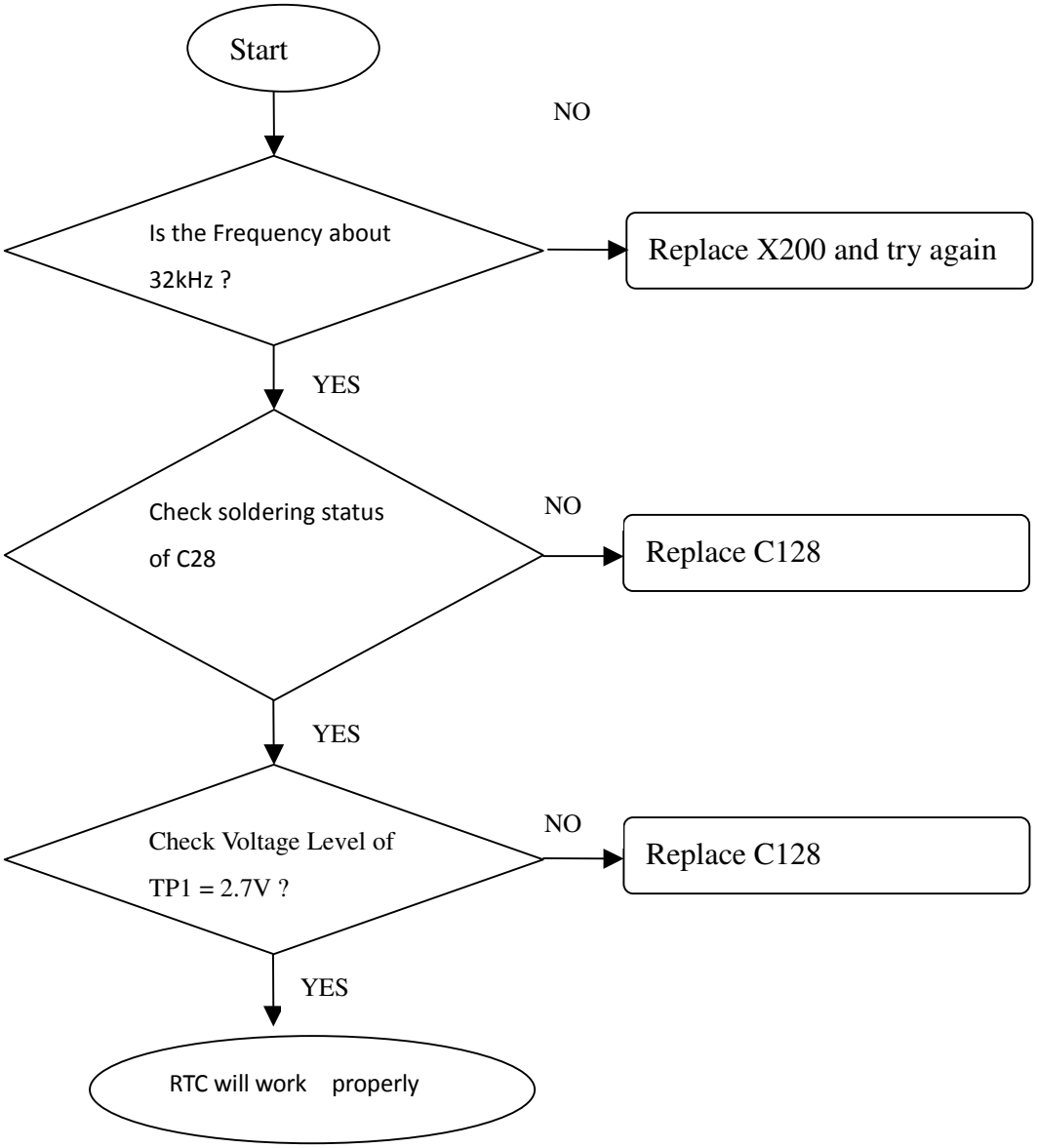
		Measure pin	PART
VRTC		C128 Pin1	Test Point



Circuit Diagram



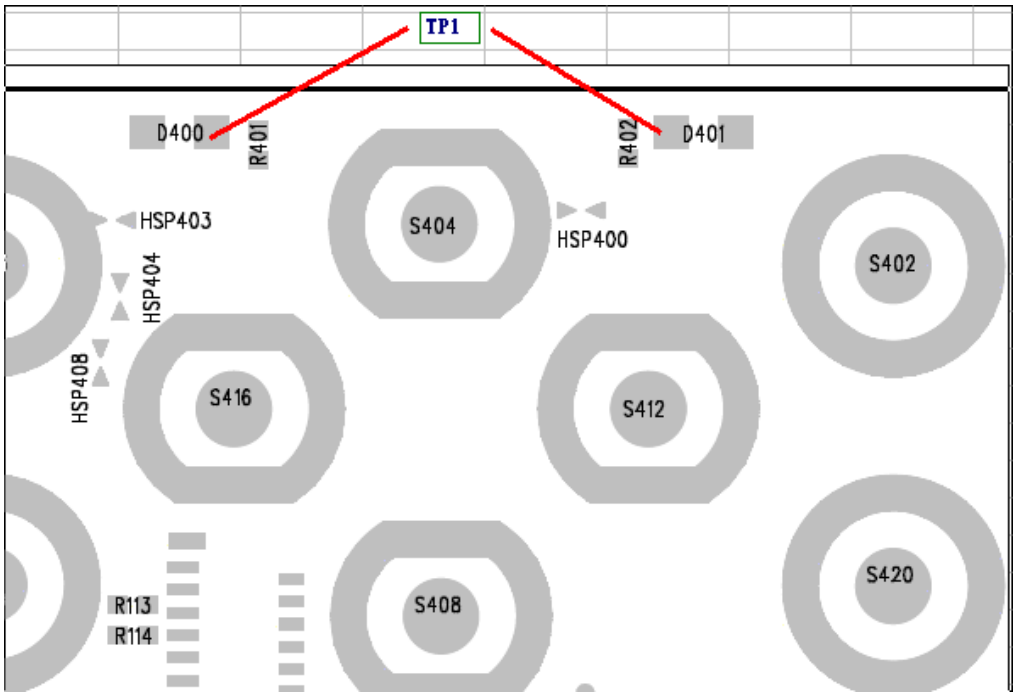
Checking Flow

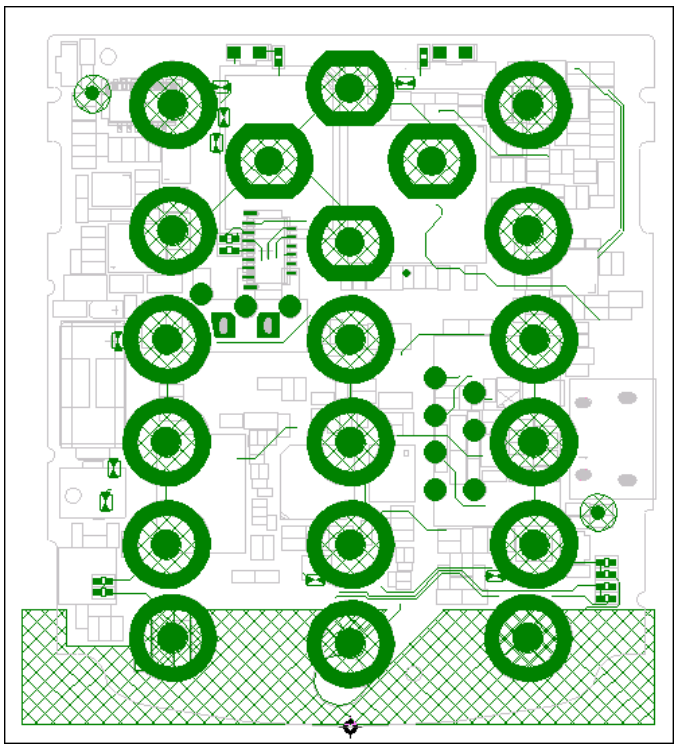


4.6 Key Backlight Trouble

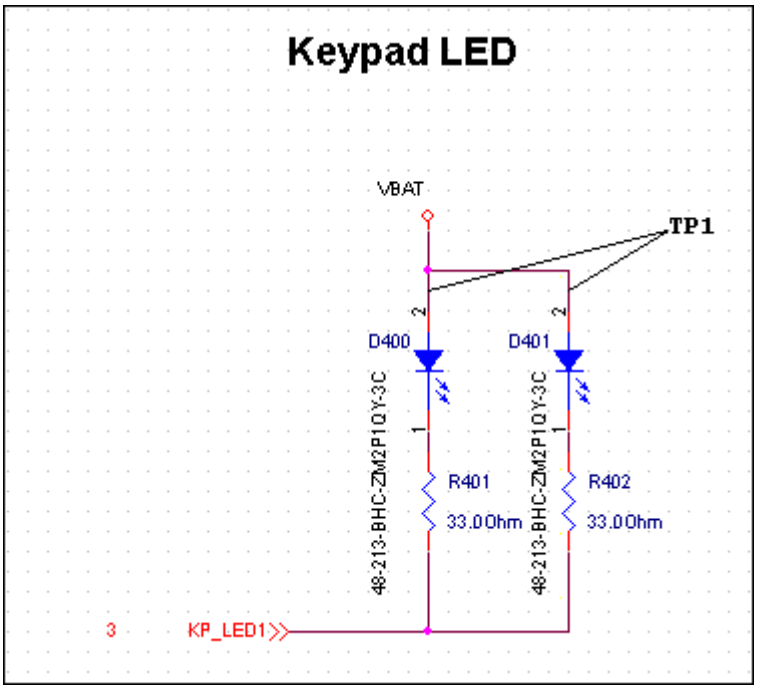
Test Point

		Measure pin	PART
VBAT		D400 Pin2	TP1
VBAT		D401 Pin2	TP1

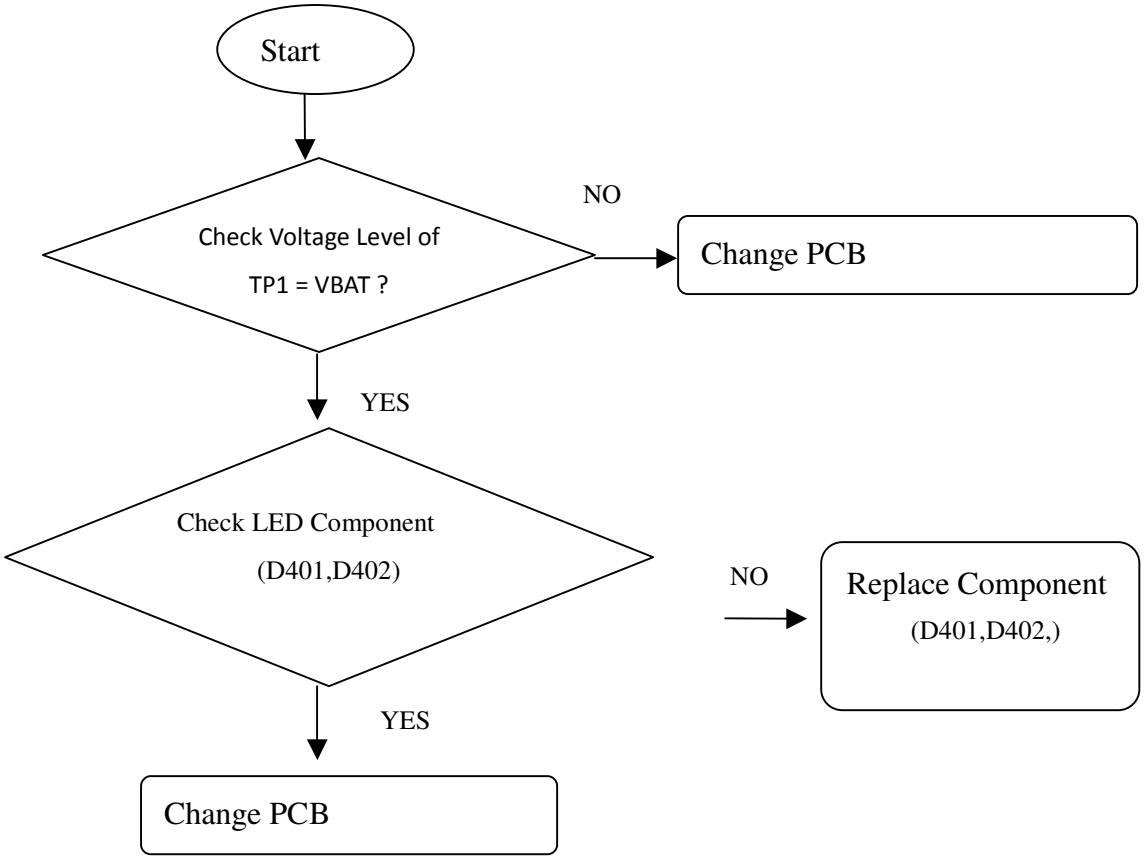




Circuit Diagram



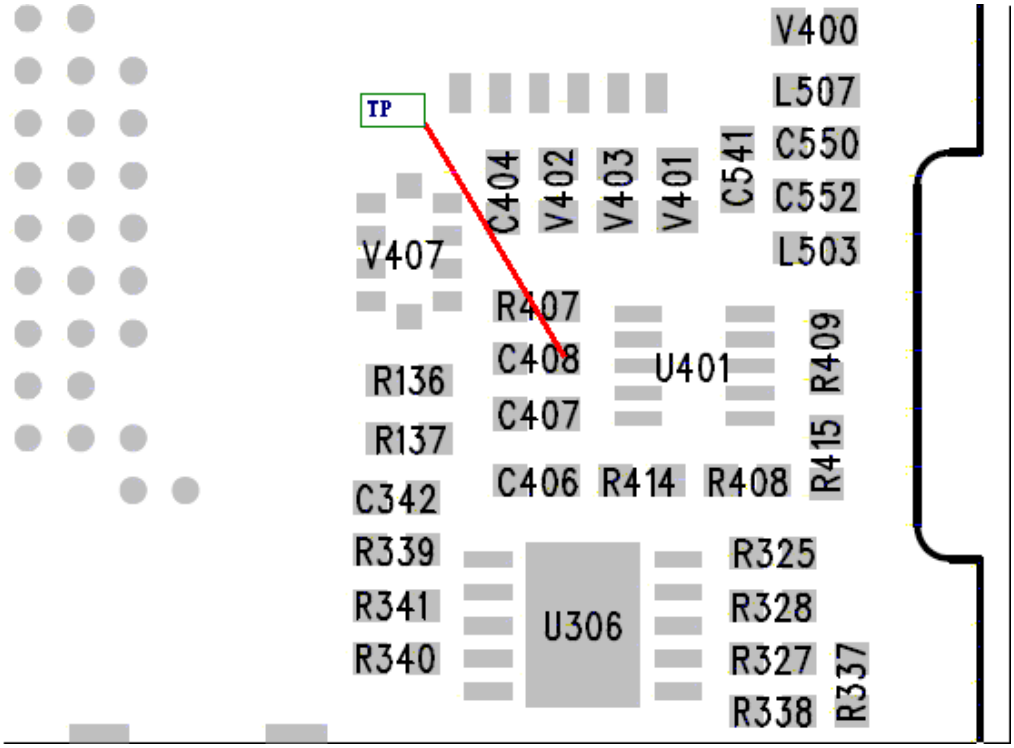
Checking Flow



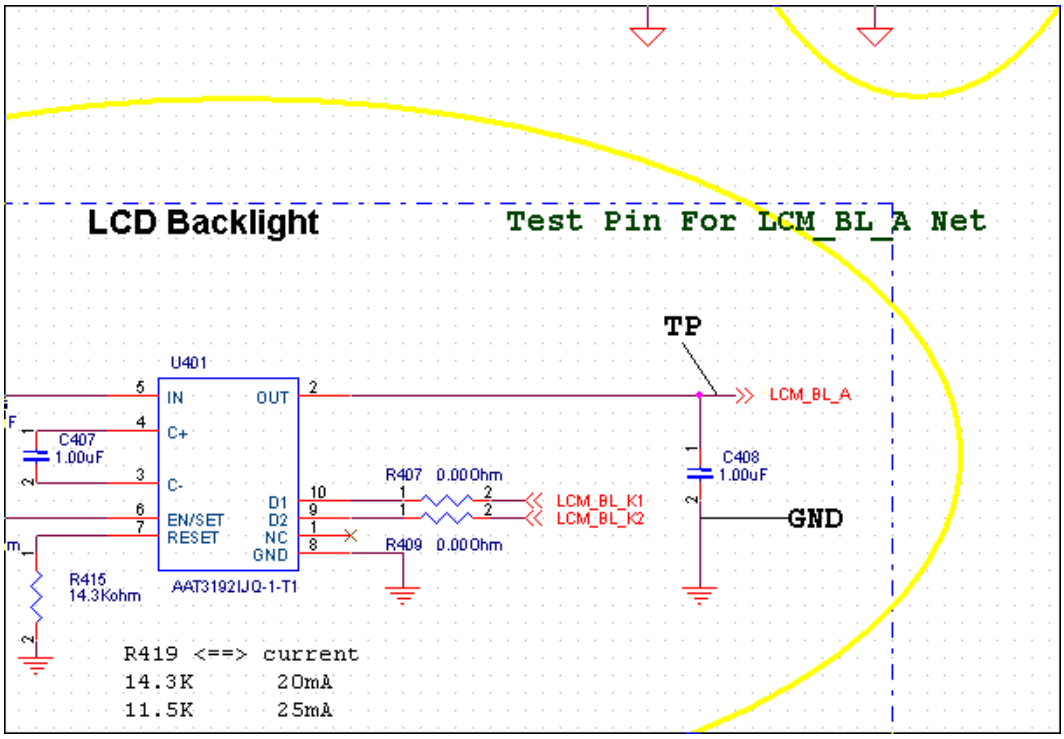
4.7 LCM Backlight Trouble

Test Point

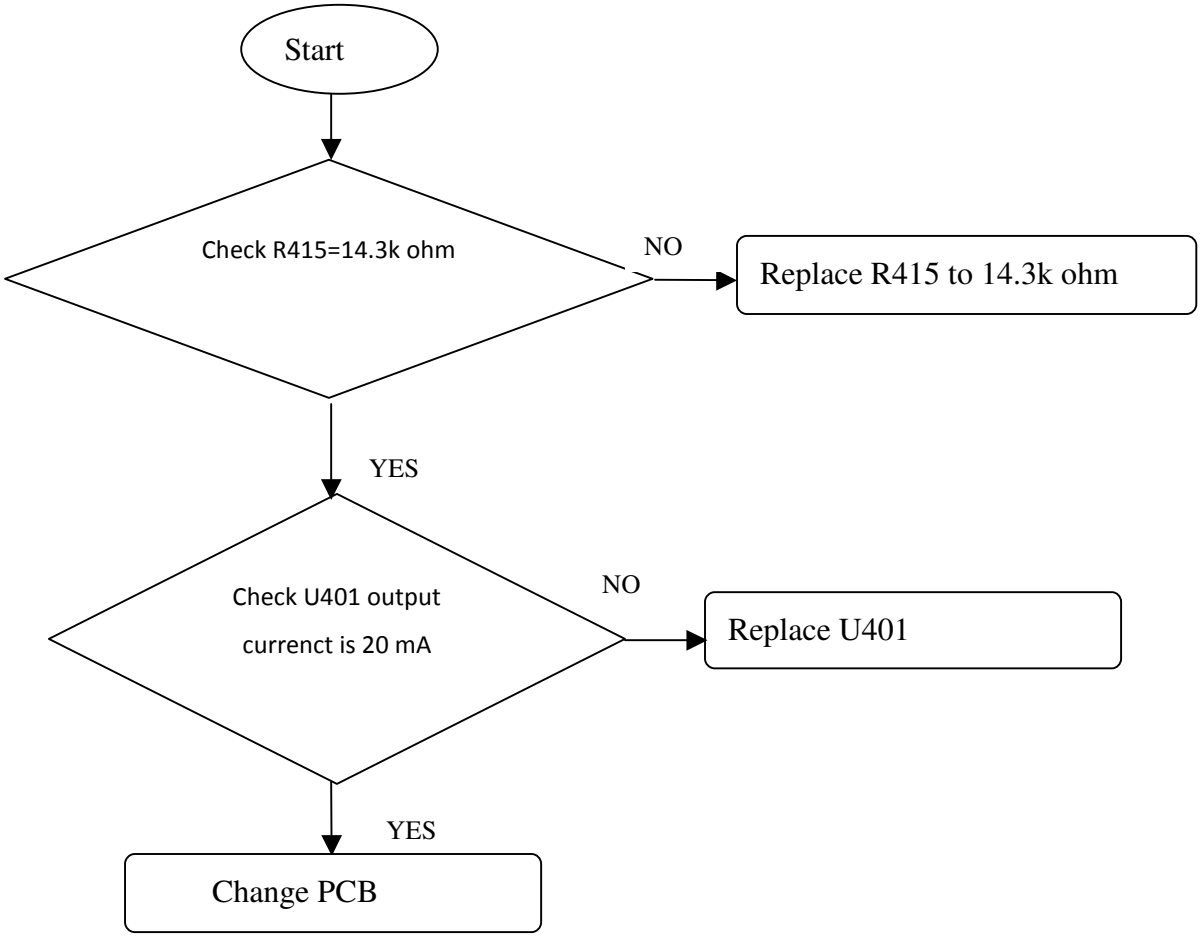
Net		Measure pin	PART
LCM_BL_A		C408 Pin1	TP



Circuit Diagram



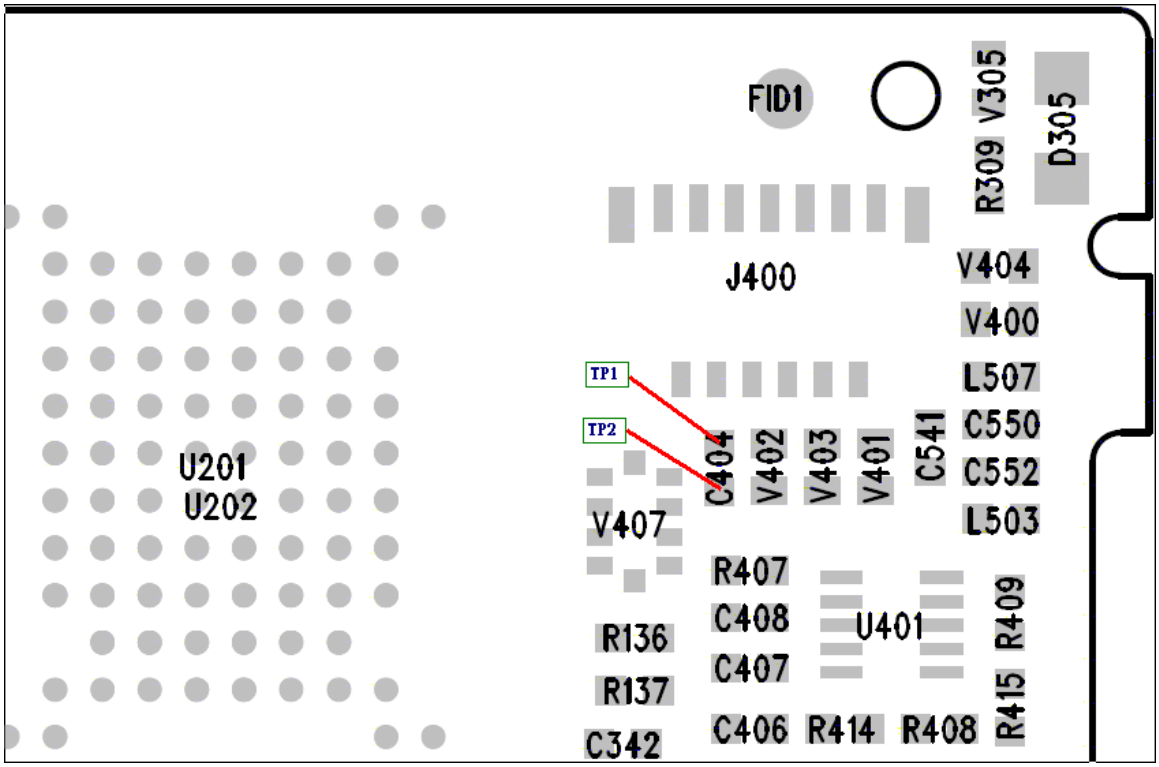
Checking Flow



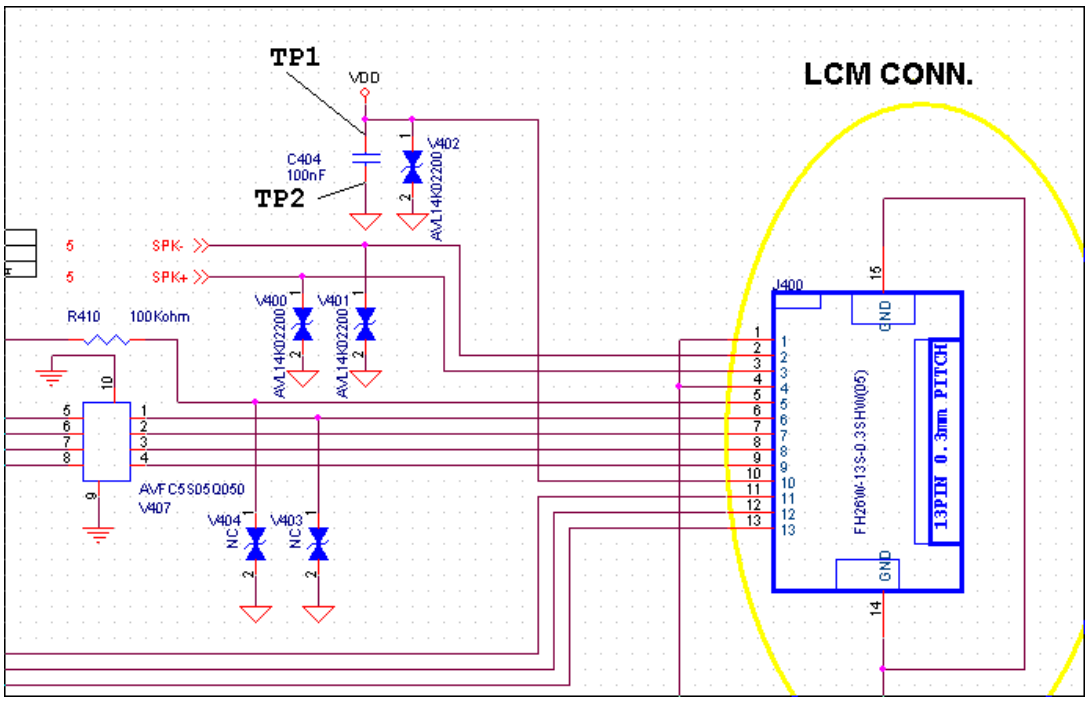
4.8 LCM Trouble

Test Point

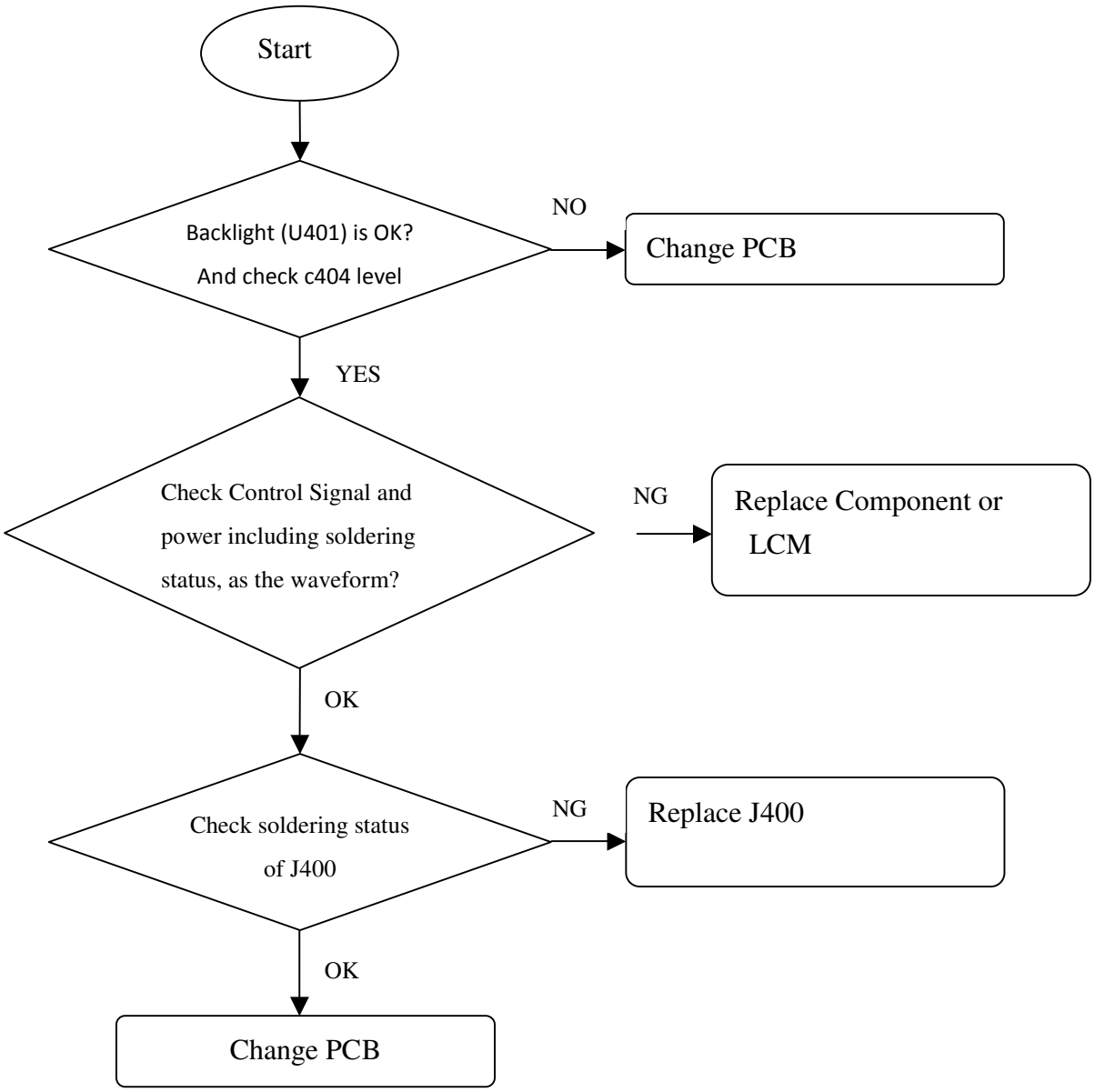
Net		Measure pin	PART
VDD		C404 Pin1	TP1
GND		C404 Pin2	TP2



Circuit Diagram



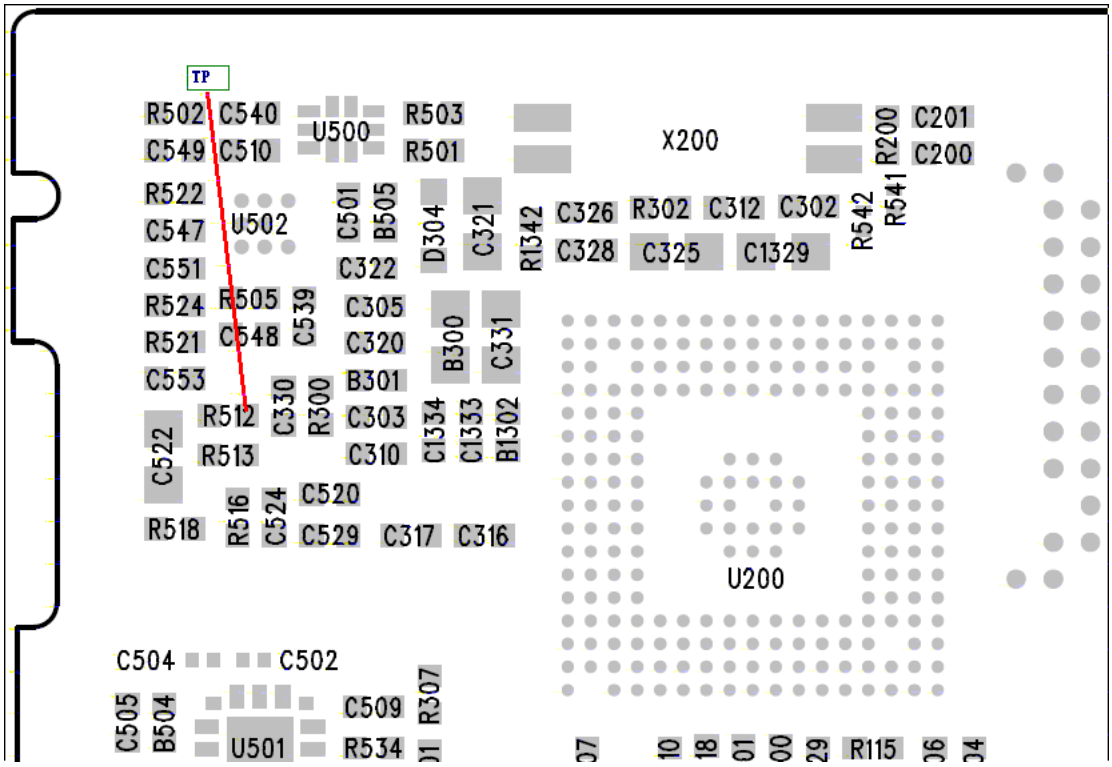
Checking Flow



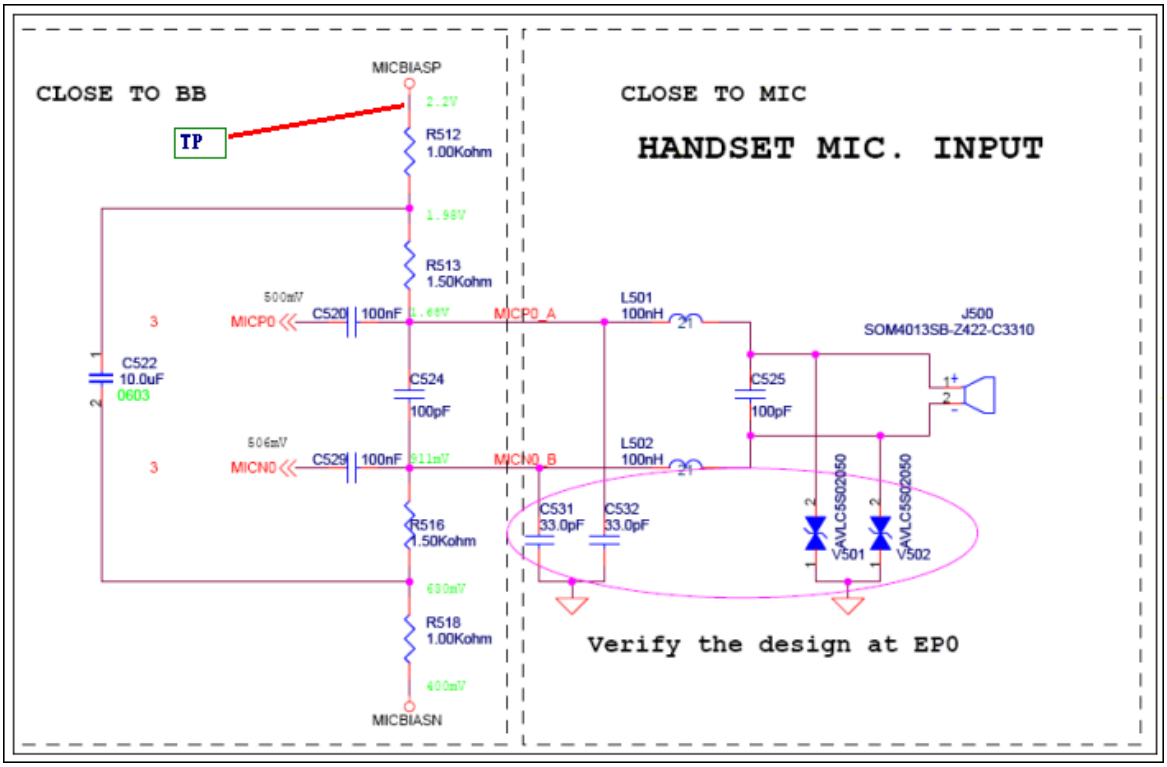
4.9 Microphone Trouble

Test Point

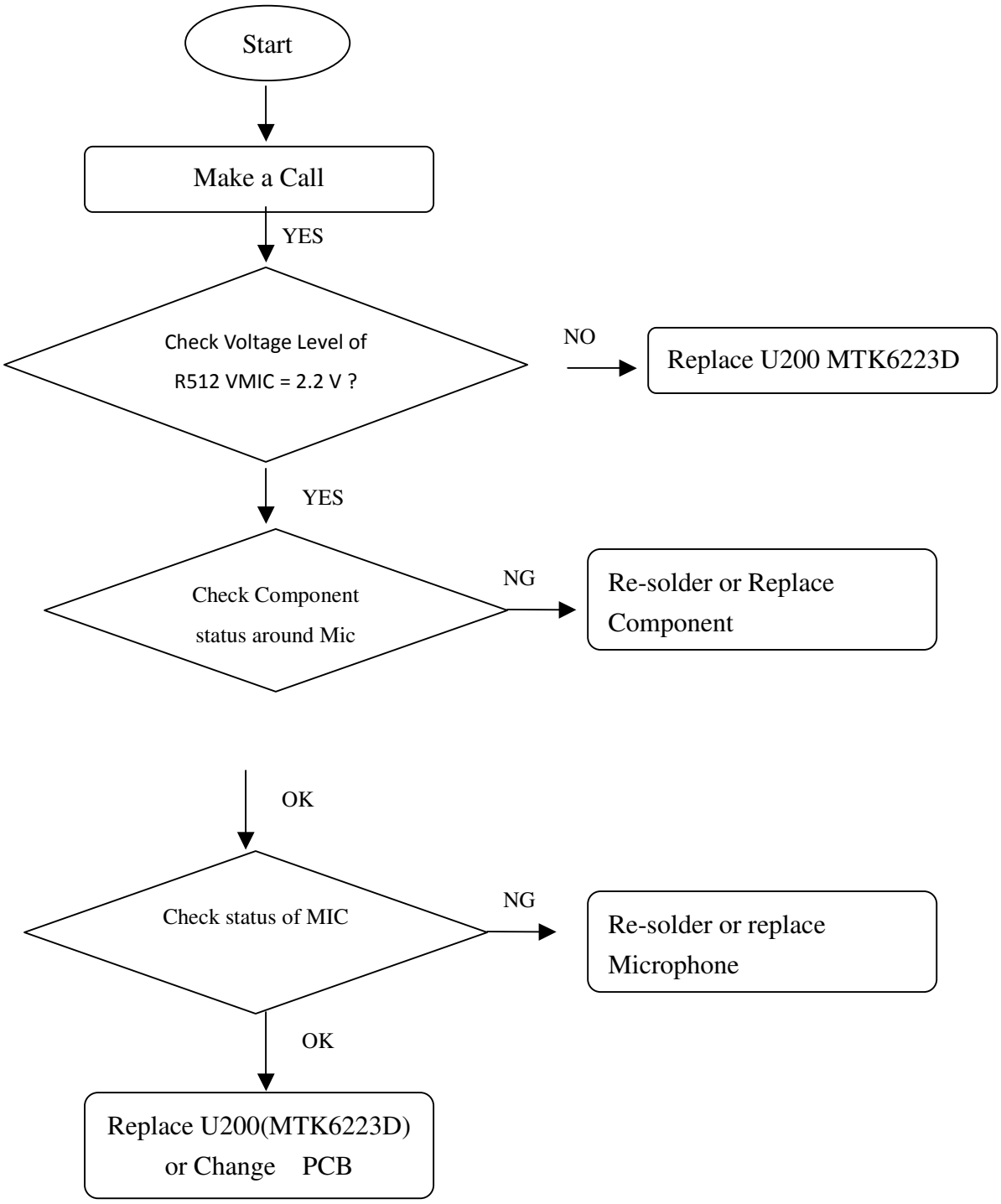
Net		Measure pin	PART
VBIAS		R512 Pin2	TP



Circuit Diagram



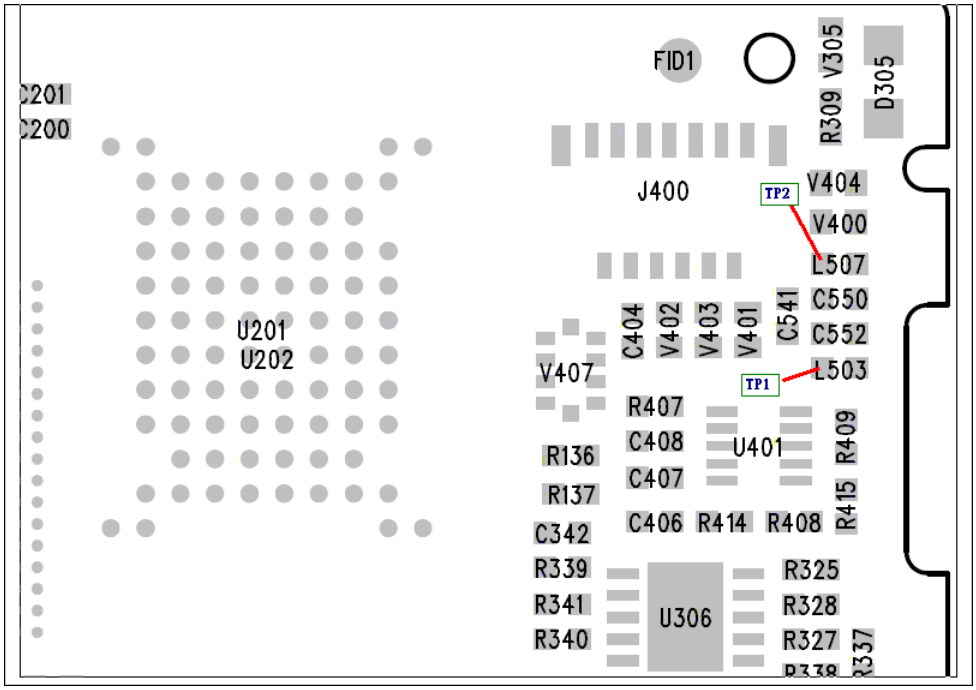
Checking Flow

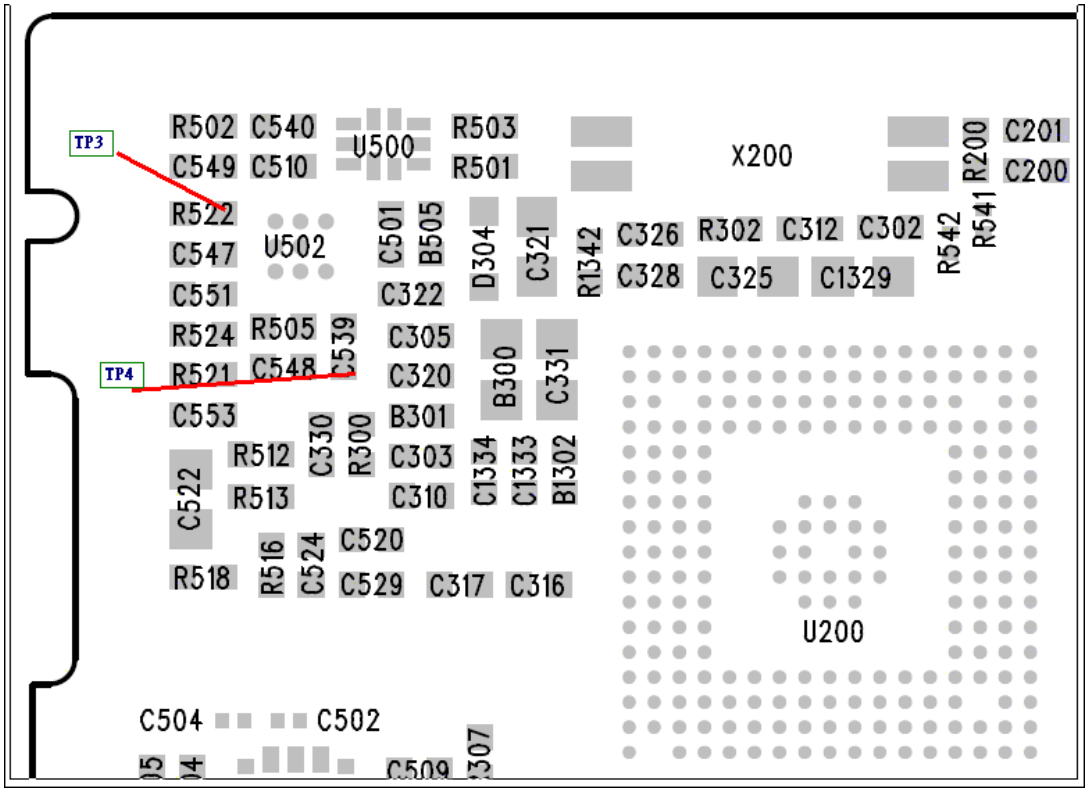


4.10 Receiver Trouble

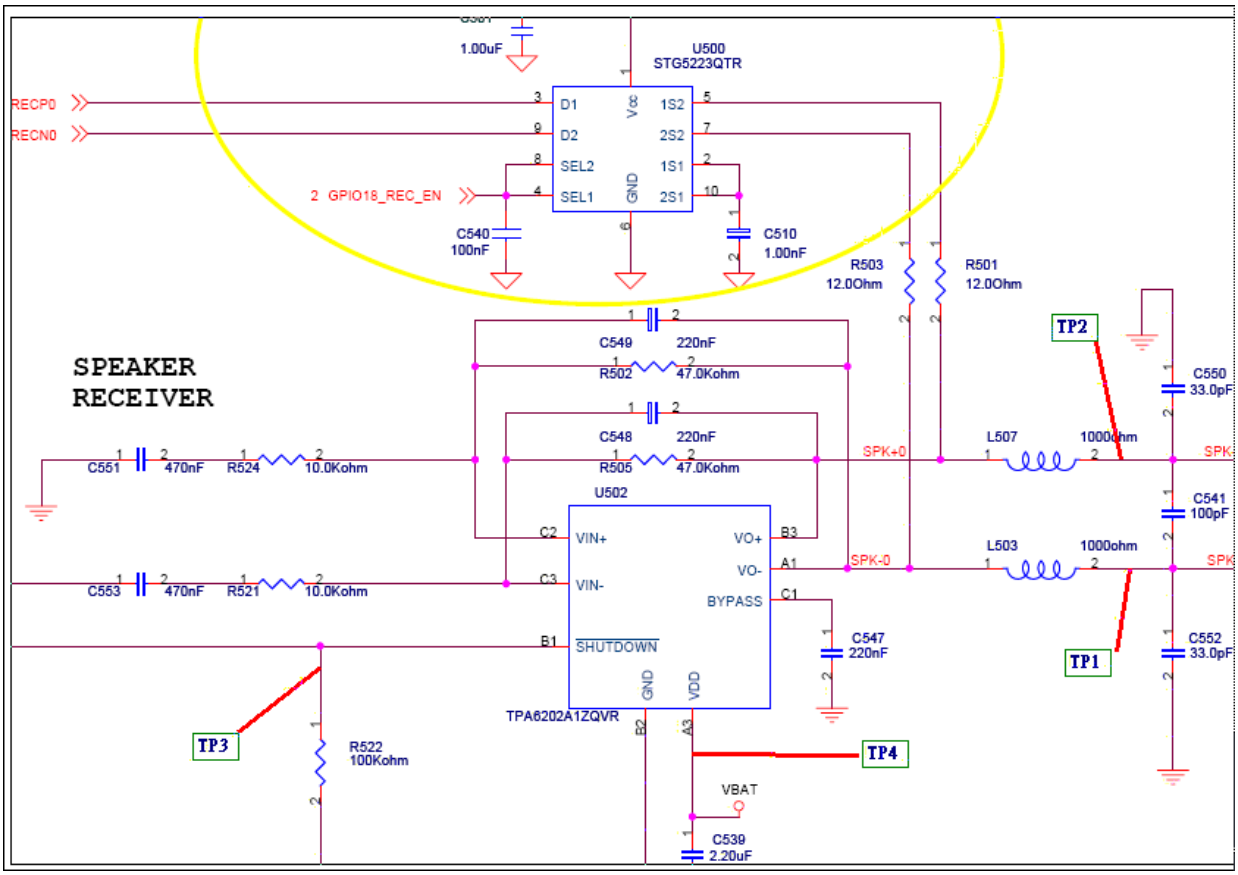
Test Point

Net		Measure pin	PART
SPK-		L503 Pin2	TP1
SPK+		L507 Pin2	TP2
U502.B1		R522 Pin1	TP3
VBAT		C539 Pin1	TP4

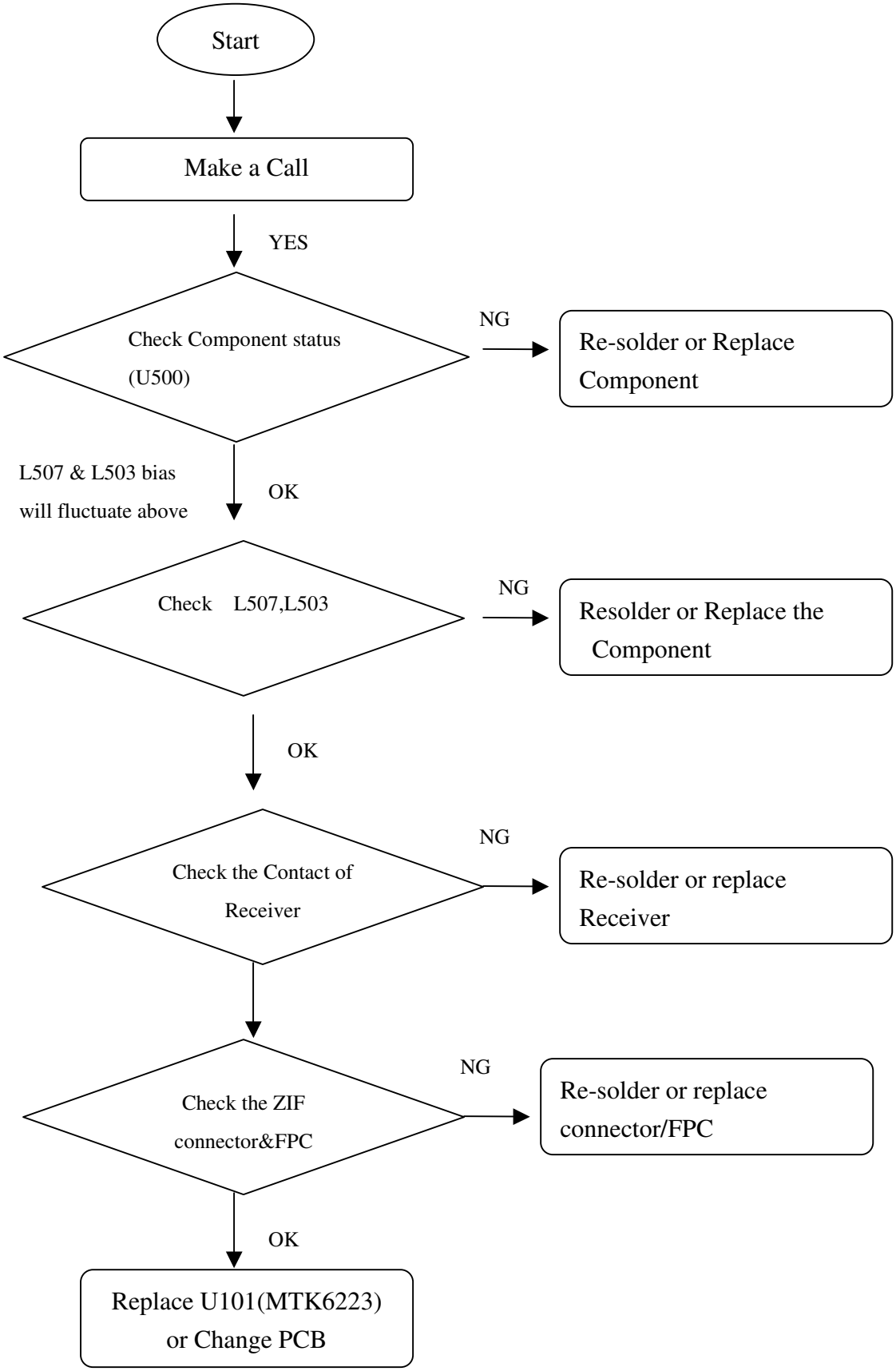




Circuit Diagram



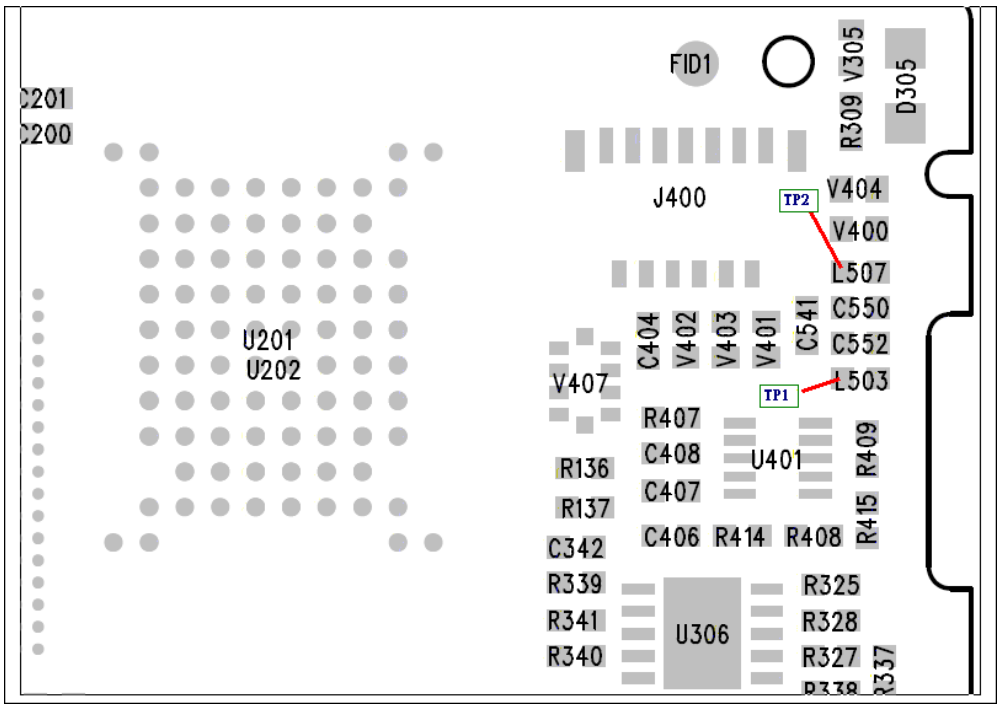
Checking Flow

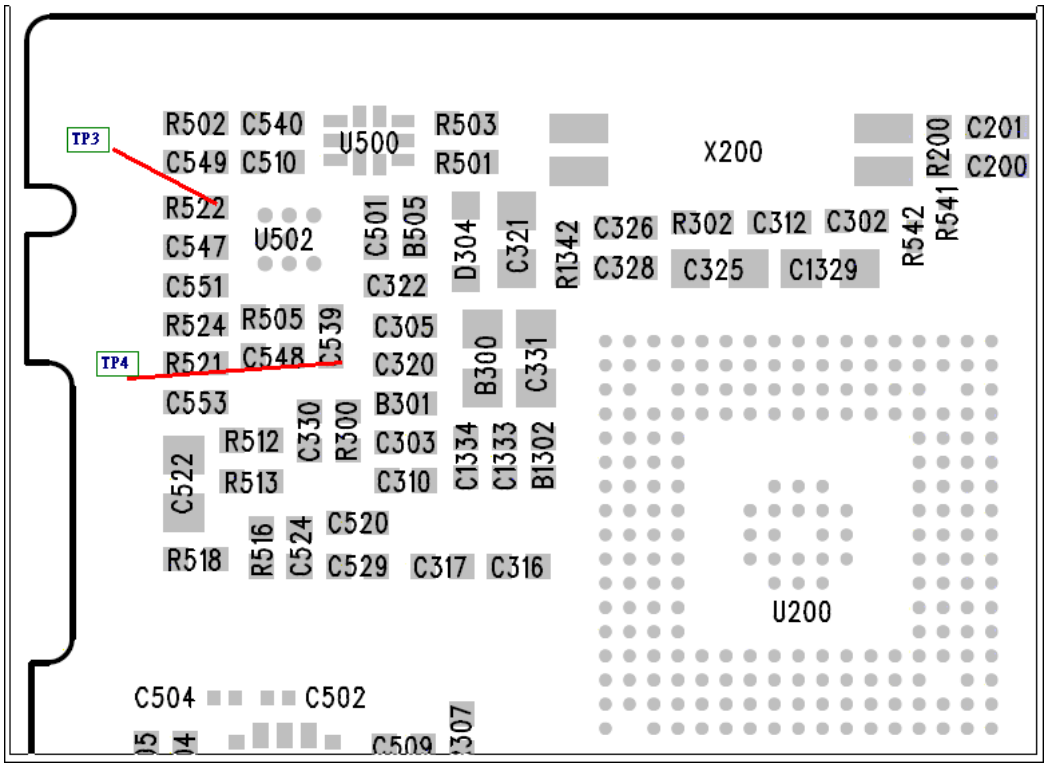


4.11 Speaker Trouble

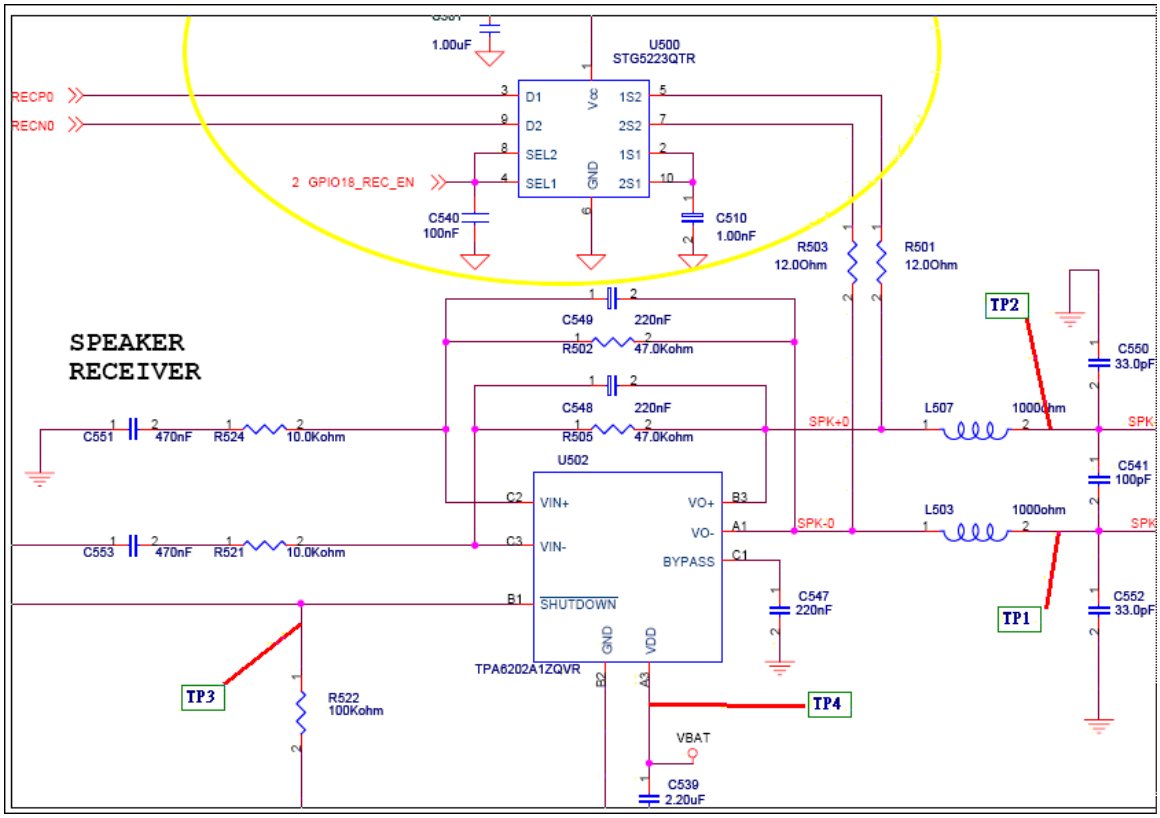
Test Point

Net		Measure pin	PART
SPK-		L503 Pin2	TP1
SPK+		L507 Pin2	TP2
U502.B1		R522 Pin1	TP3
VBAT		C539 Pin1	TP4

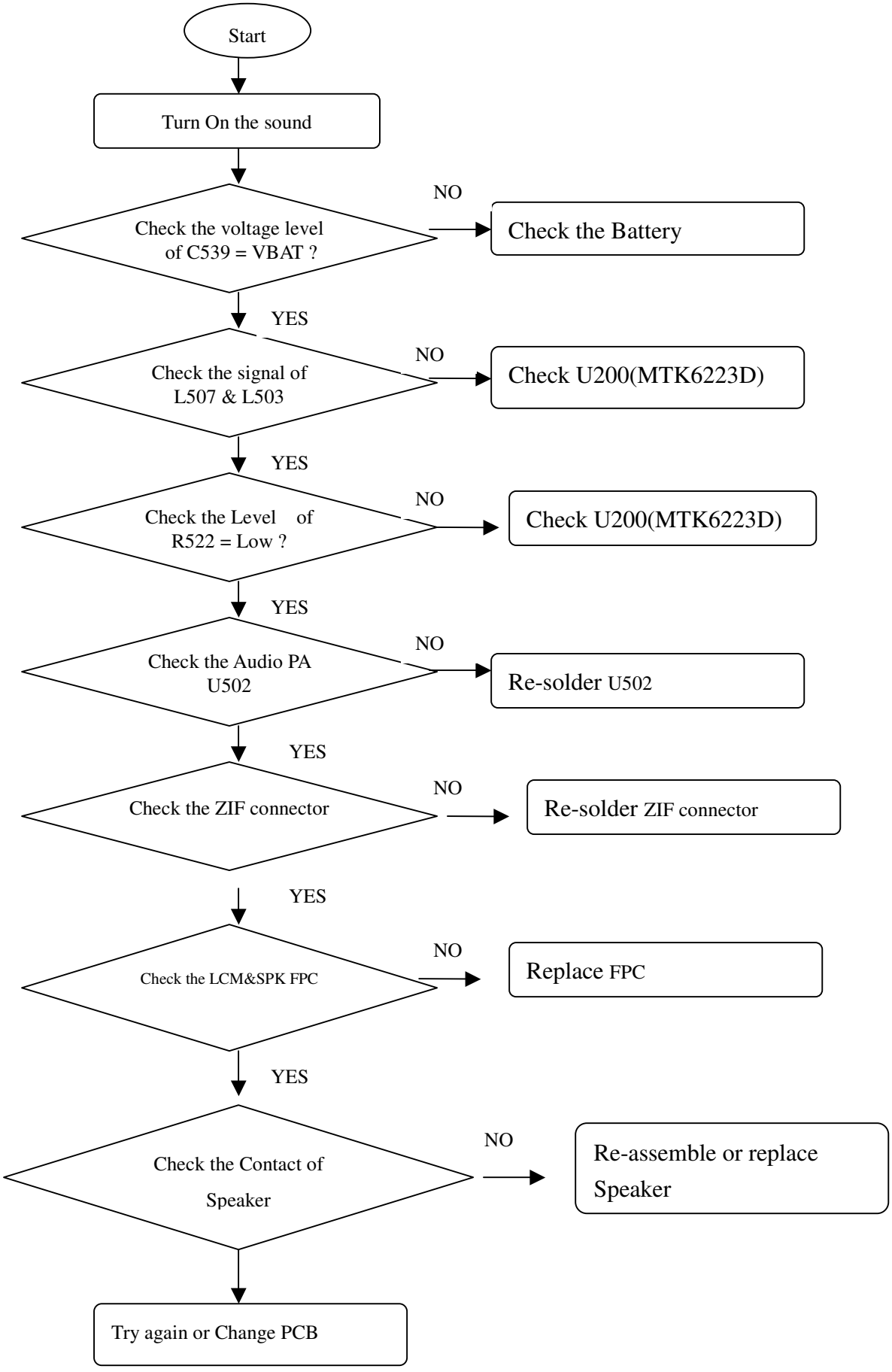




Circuit Diagram



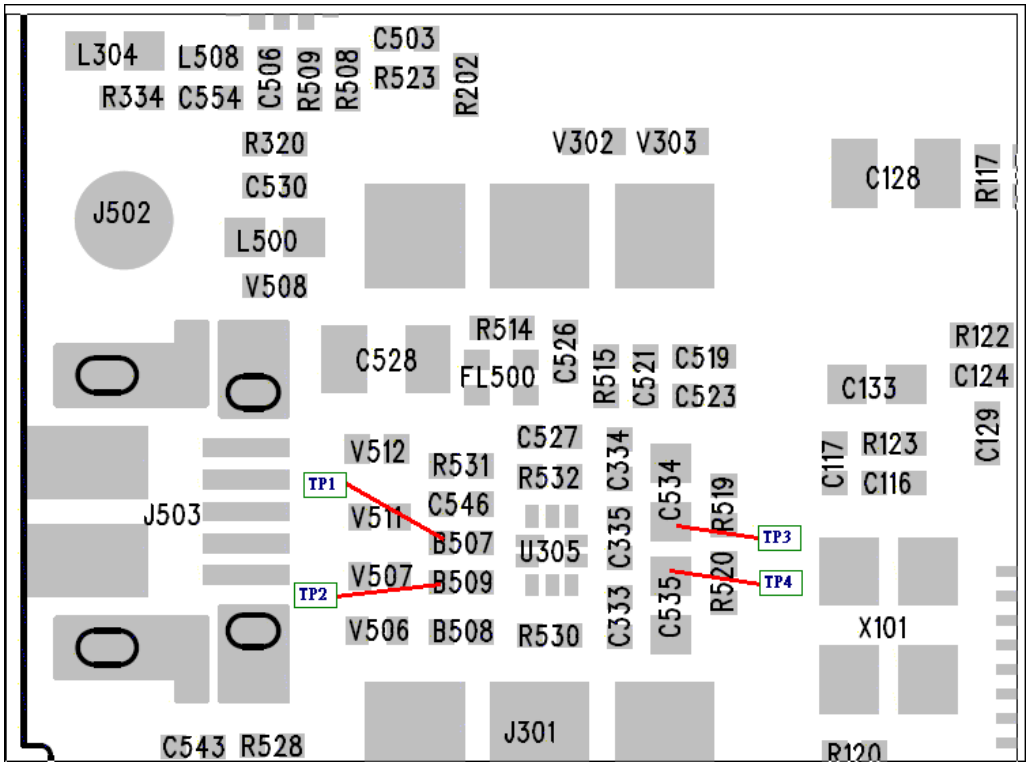
1.11.3 Checking Flow



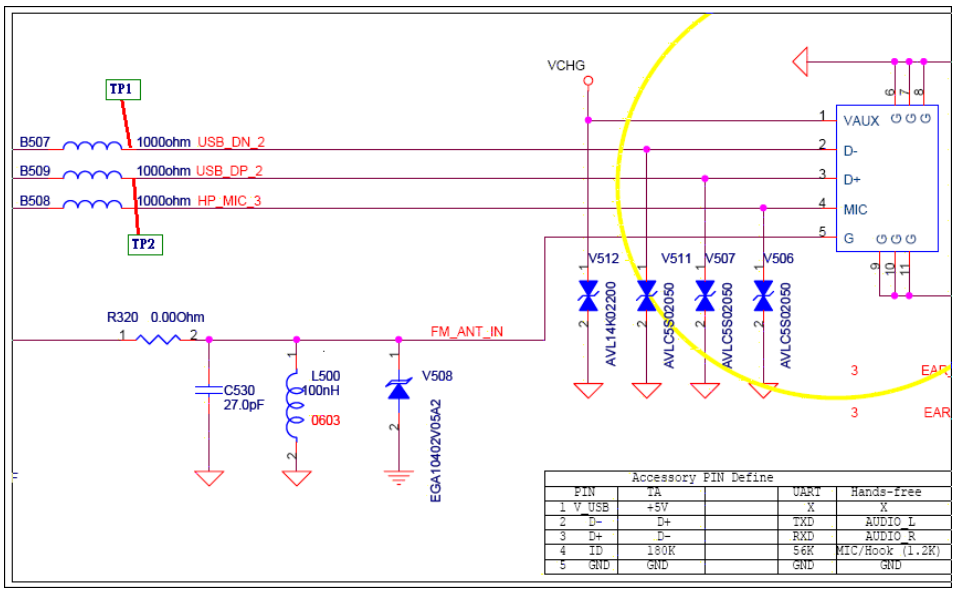
4.12 Headphone Trouble

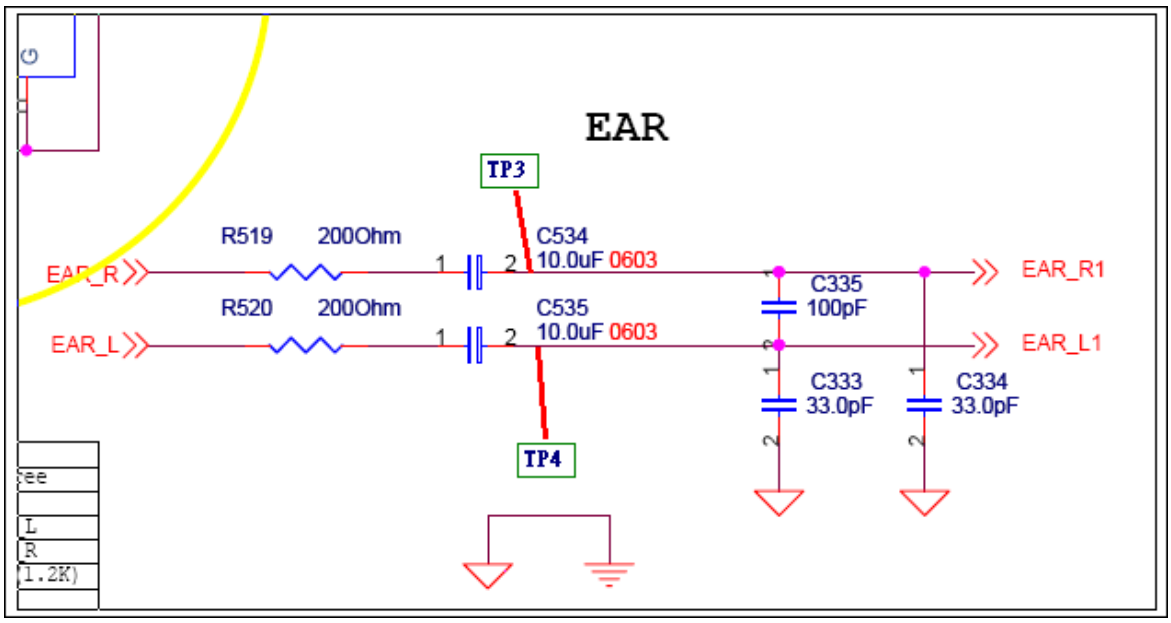
Test Point

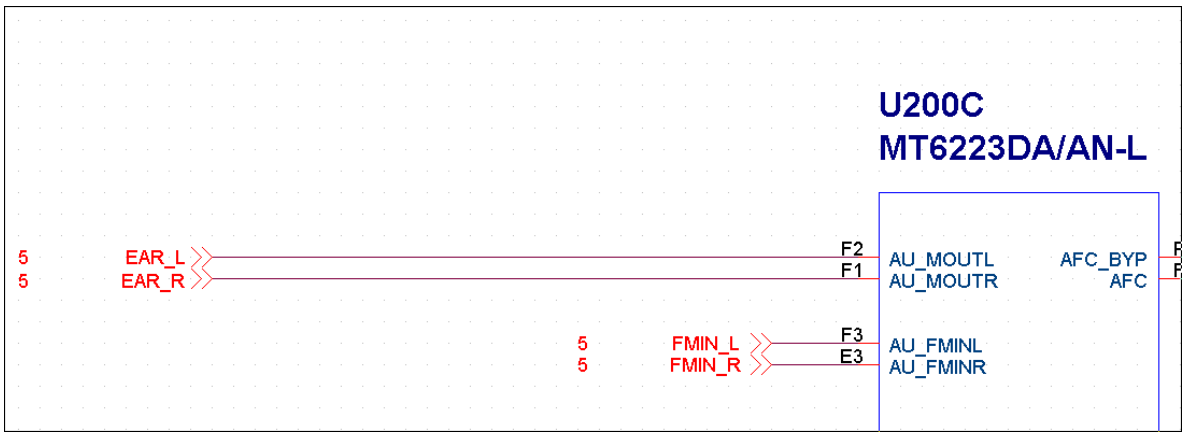
Net		Measure pin	PART
USB_DN_2		B507 Pin2	TP1
USB_DP_2		B509 Pin2	TP2
EAR_R1		C534 Pin2	TP3
EAR_L1		C535 Pin2	TP4



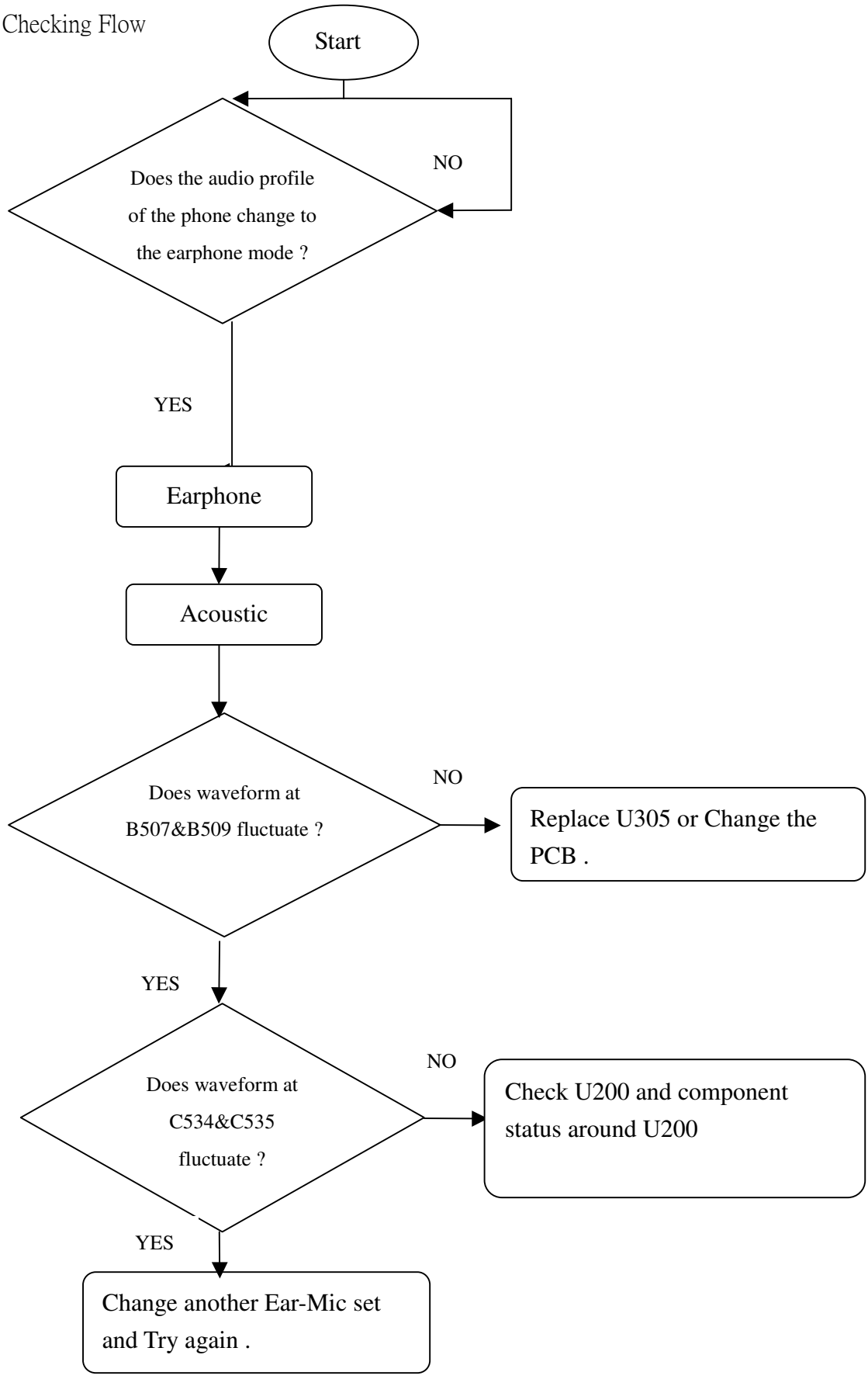
Circuit Diagram




EAR
TP3
R519
200Ohm
C534
10.0uF 0603
EAR_R
R520
200Ohm
C535
10.0uF 0603
EAR_L
C335
100pF
EAR_R1
EAR_L1
C333
33.0pF
C334
33.0pF
TP4


U200C
MT6223DA/AN-L
5
EAR_L
5
EAR_R
F2
F1
AU_MOUTL
AU_MOUTR
AFC_BYP
AFC
5
FMIN_L
5
FMIN_R
F3
E3
AU_FMINL
AU_FMINR

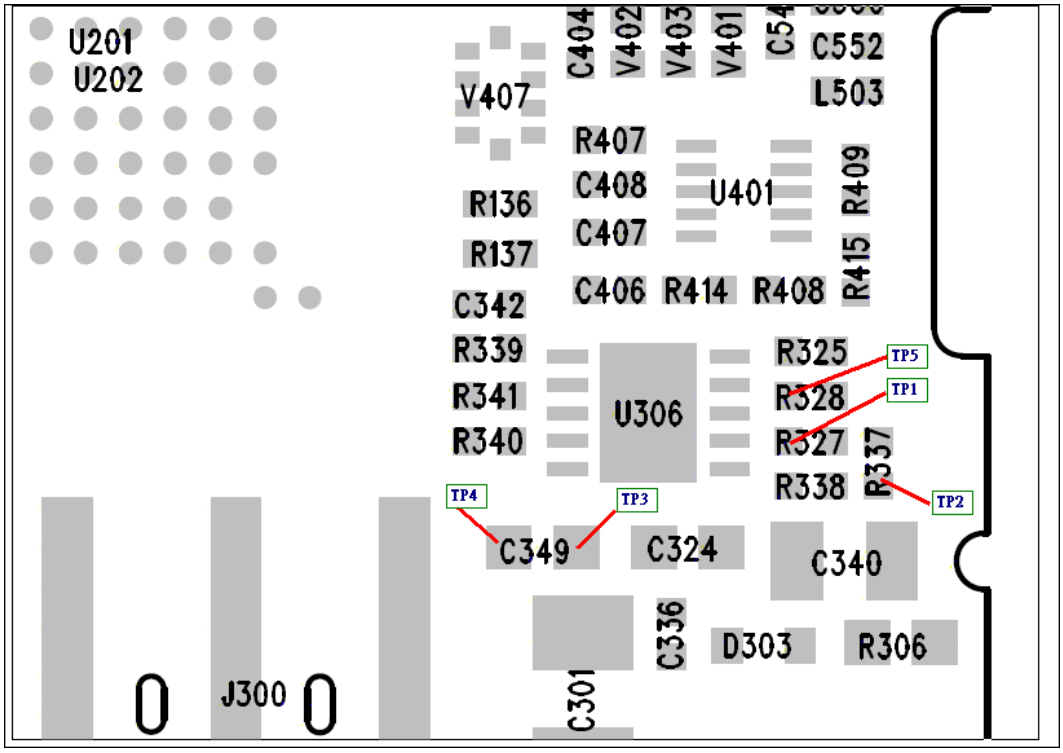
Checking Flow



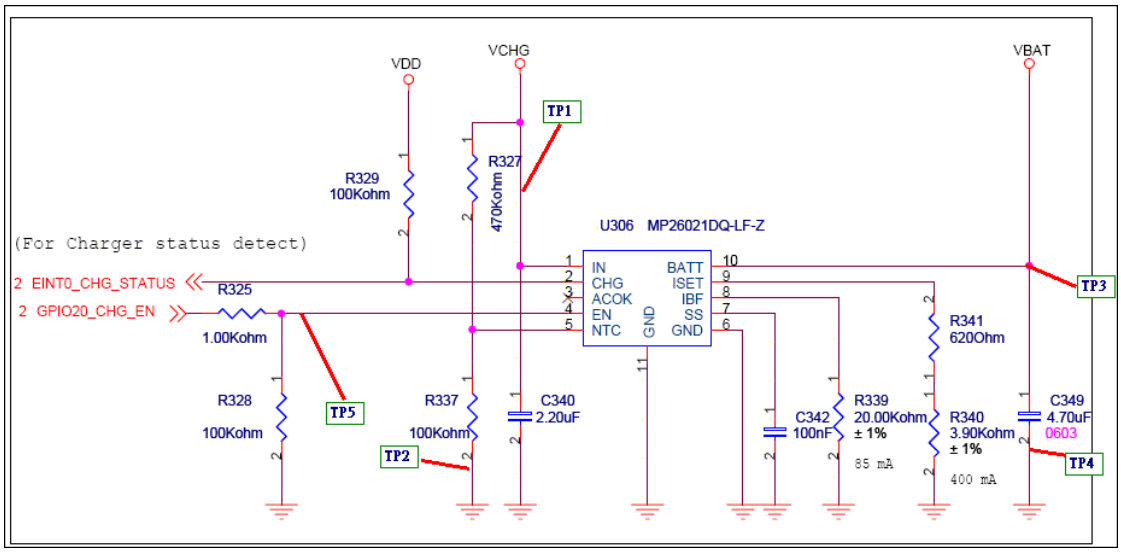
4.13 Charging Trouble

Test Point

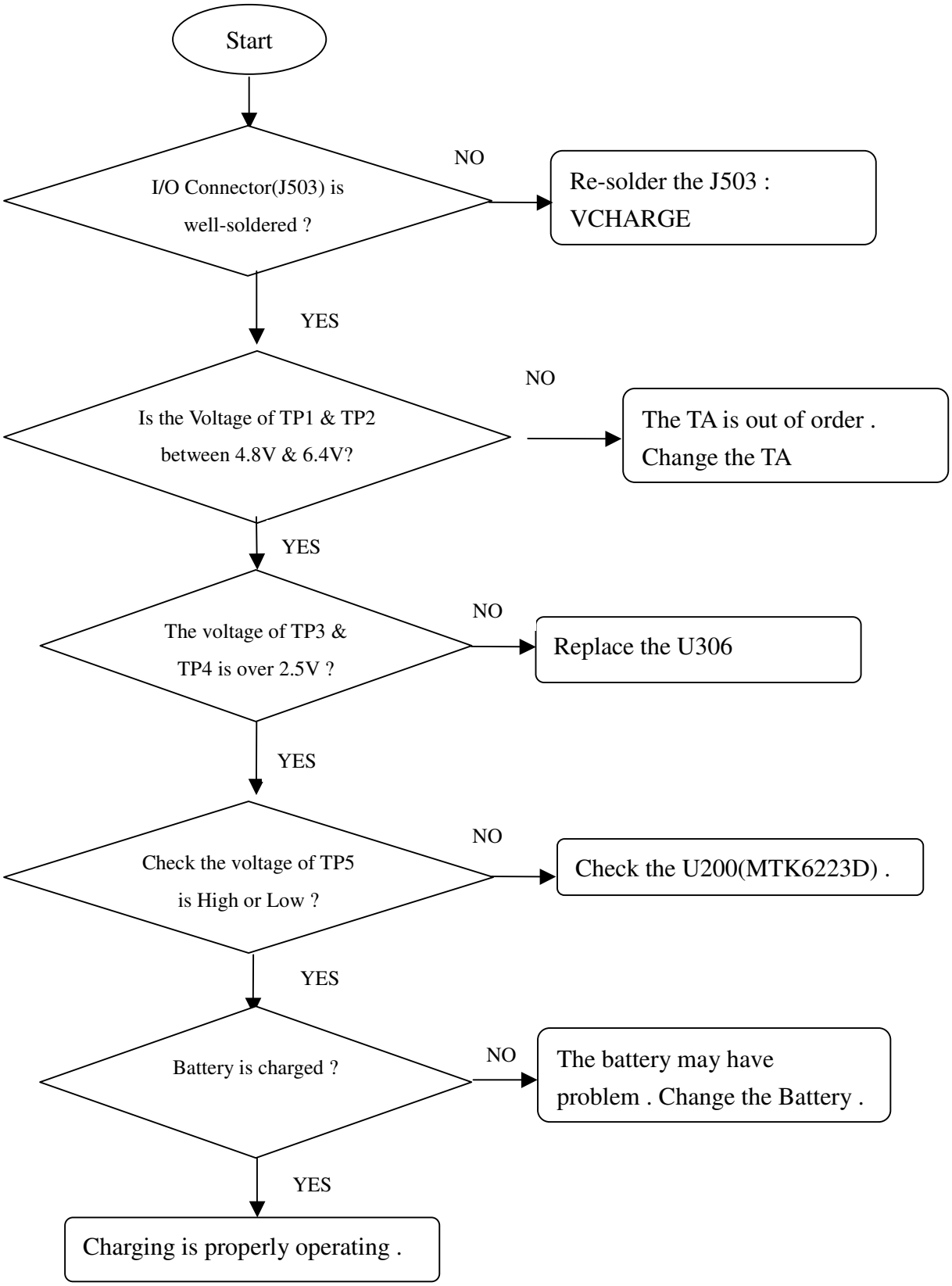
Net		Measure pin	PART
		R327 Pin1	TP1
		R337 Pin2	TP2
VBAT		C349.1 Pin1	TP3
GND		C349.2 Pin2	TP4
		R328 Pin1	TP5



Circuit Diagram



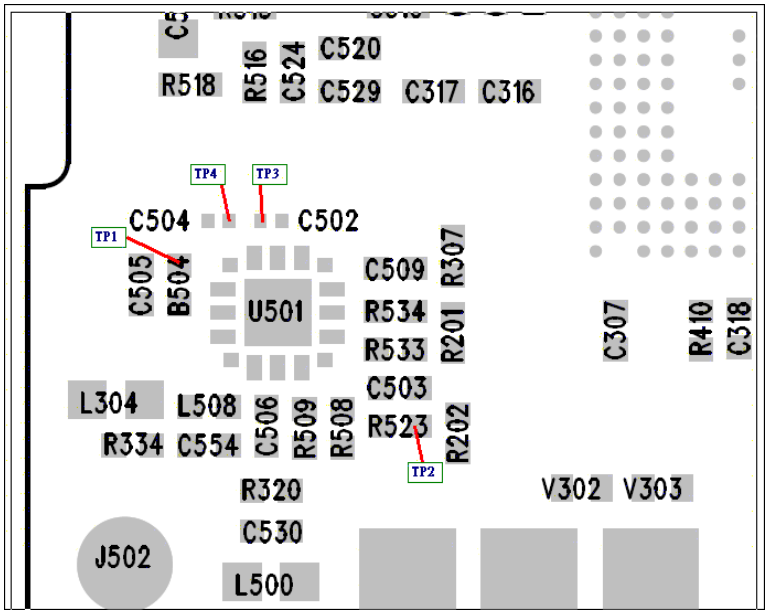
Checking Flow



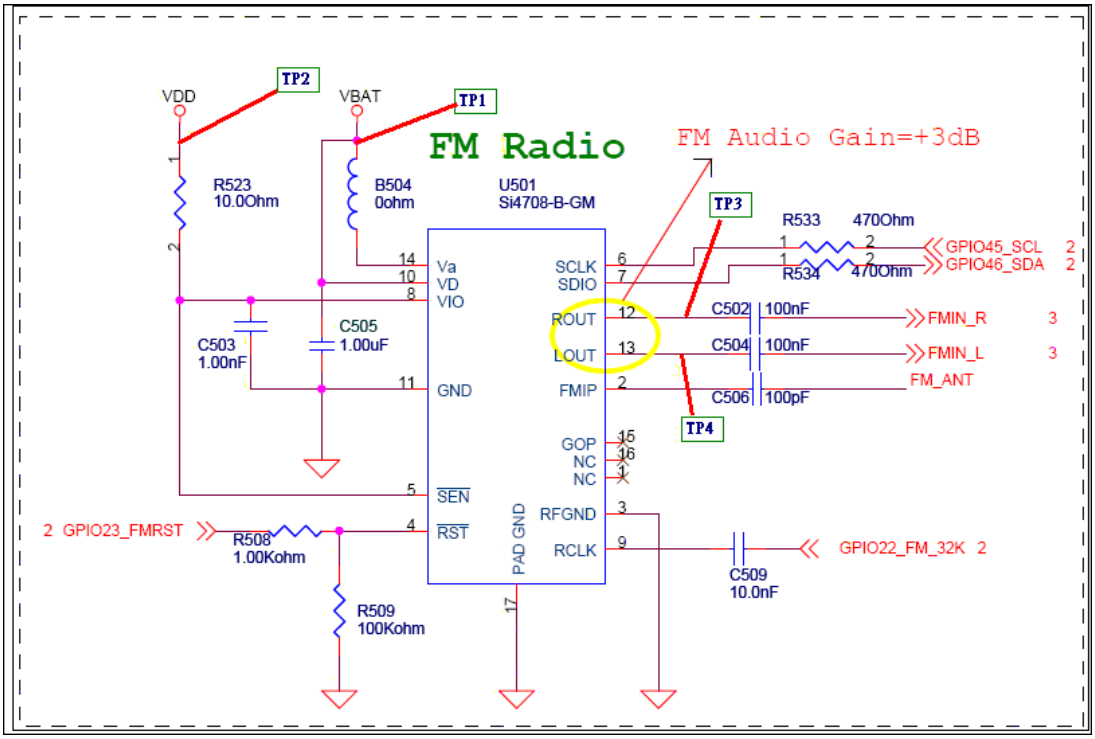
4.14 FM Radio Trouble

Test Point

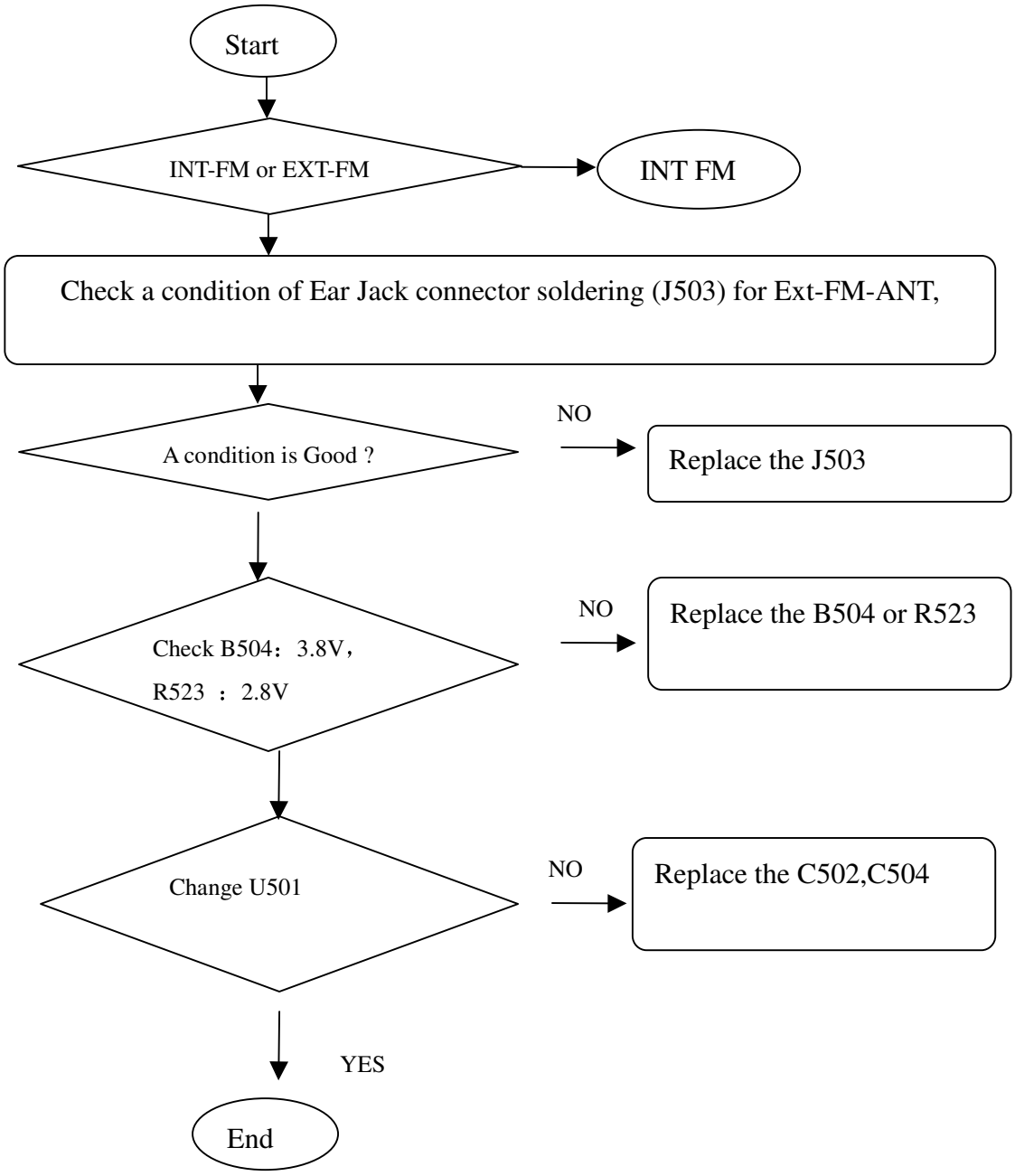
Net		Measure pin	PART
VBAT		B504 Pin2	TP1
VDD		R523 Pin1	TP2
		C502 Pin1	TP3
		C504 Pin1	TP4



Circuit Diagram

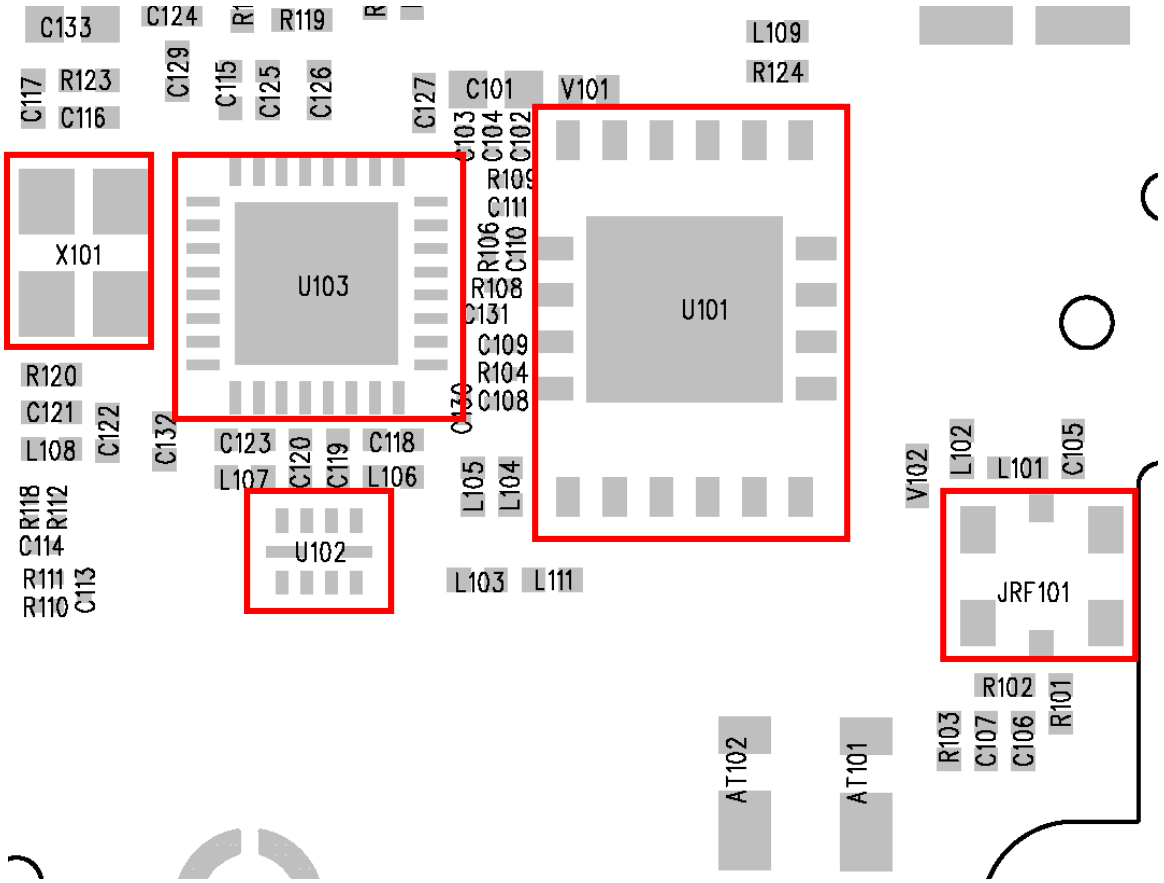


Checking Flow



4.15 RF Trouble

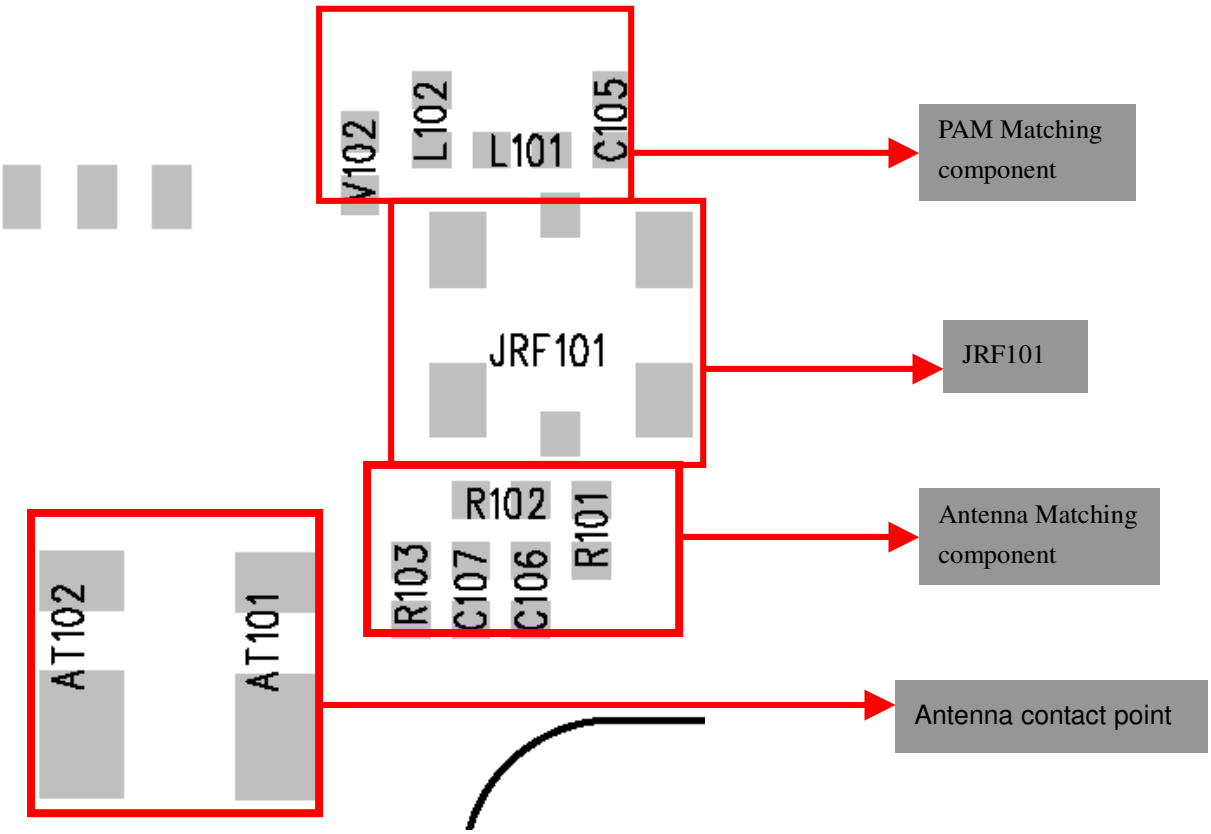
RF Module



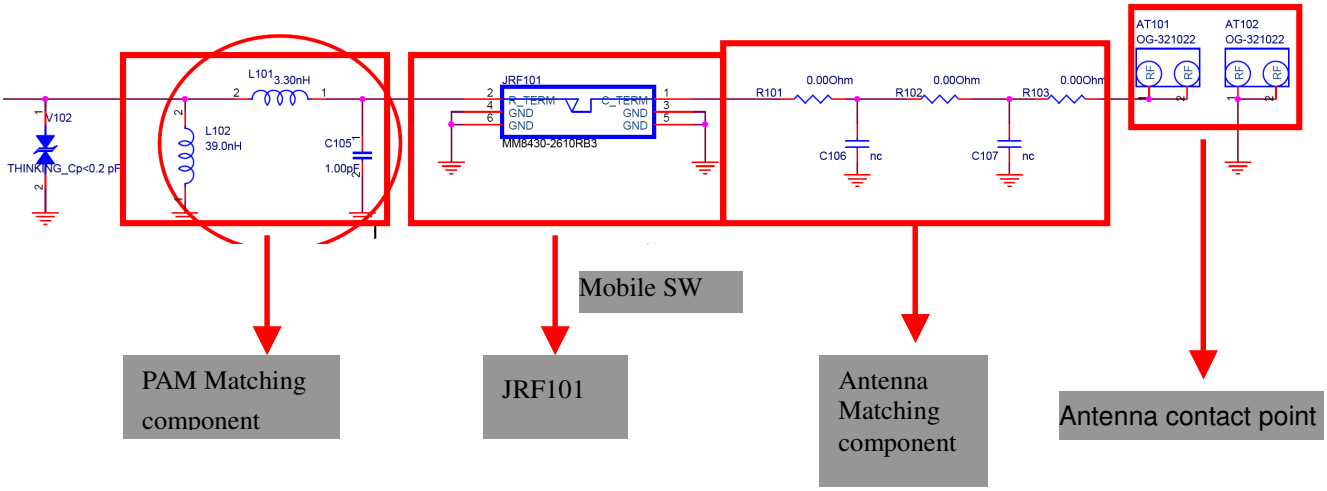
REFERENCE	PART Description
U101	PAM (Power Amp. Module+ASM)
X101	DCXO (26MHz)
JRF101	Mobile Switch
U102	RX SAW Filter
U103	Transceiver

No Connection Trouble

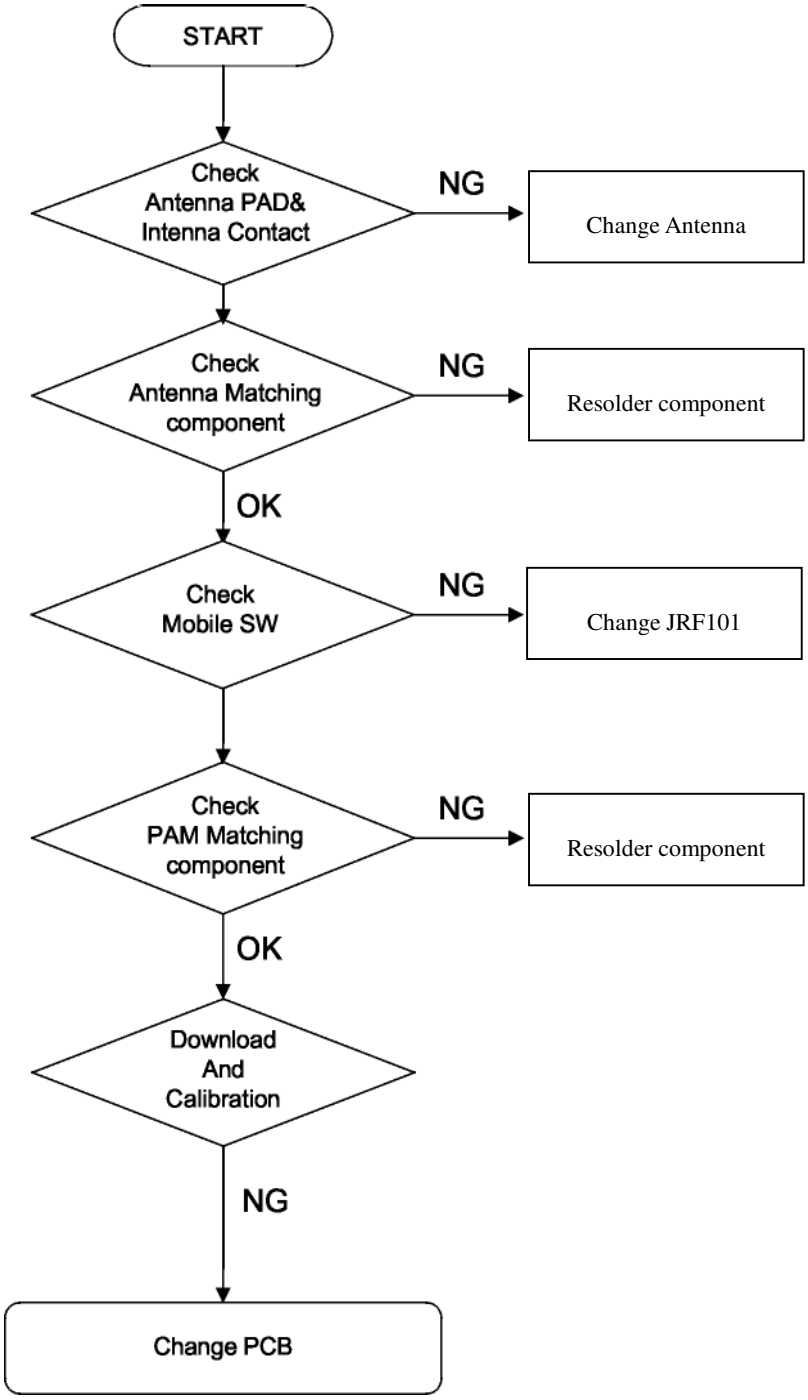
TEST POINT



CIRCUIT

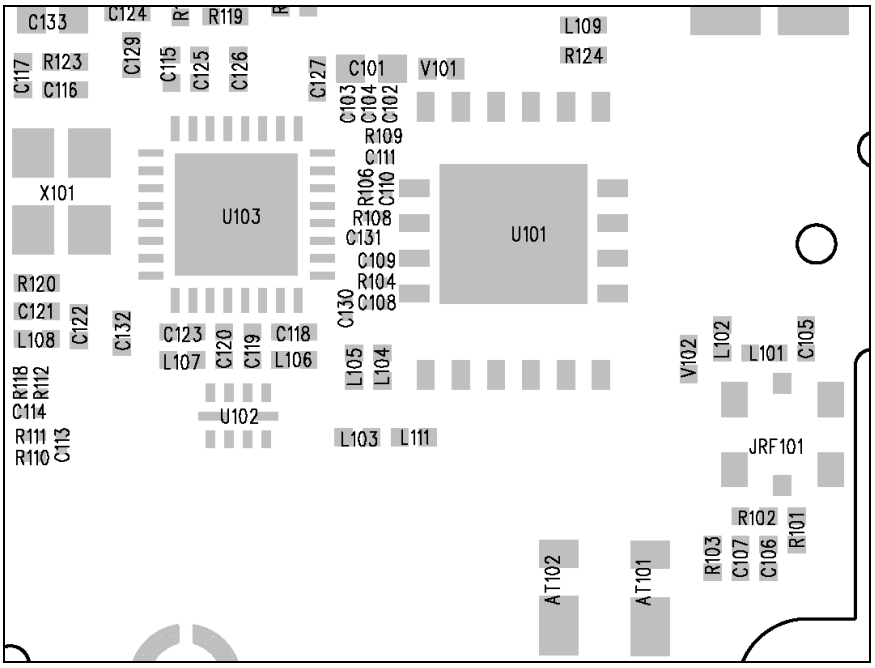


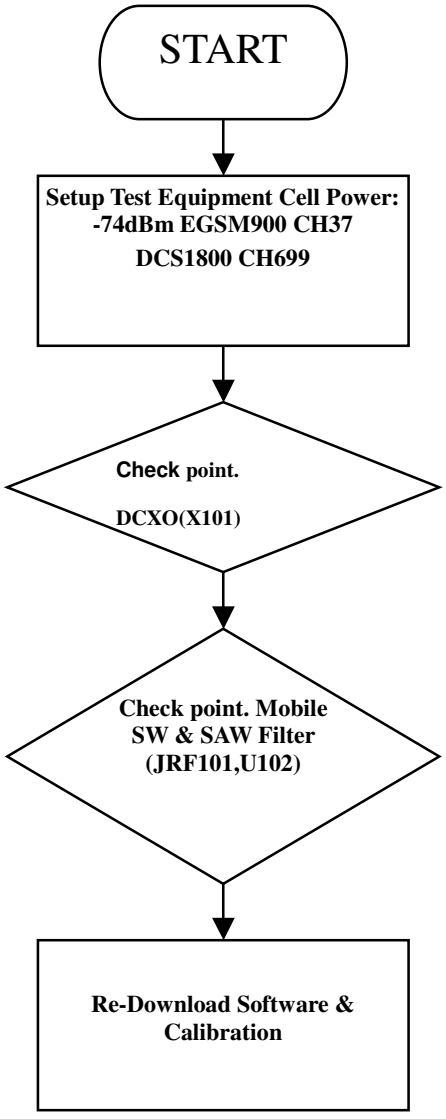
CHECKING FLOW



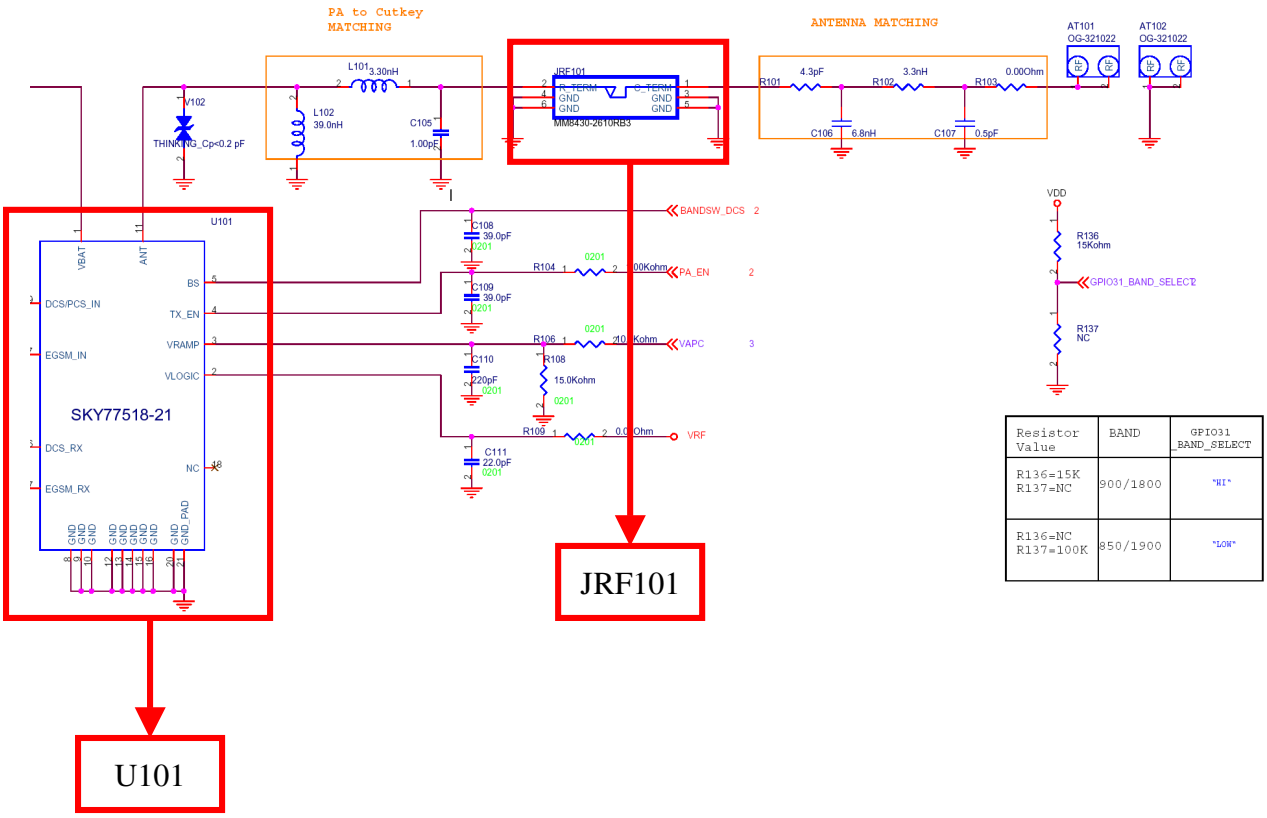
RX Trouble

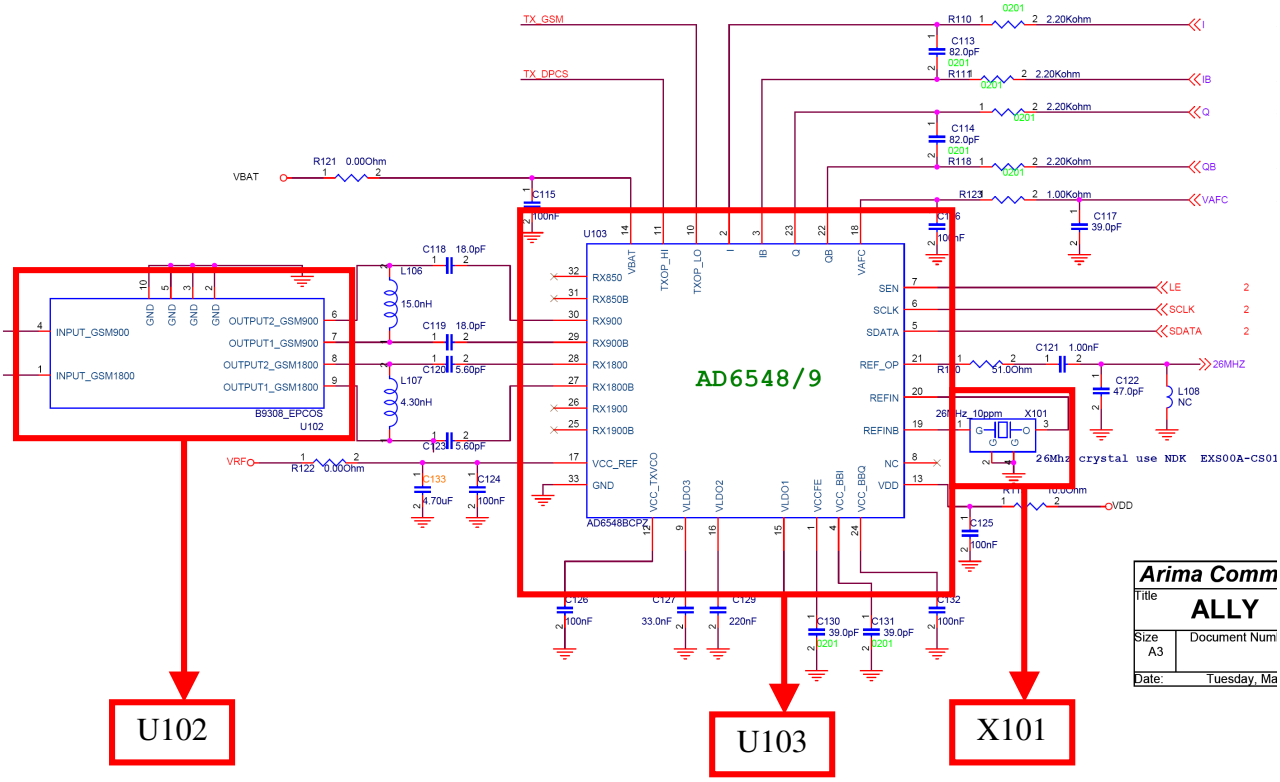
TEST POINT CHECKING FLOW





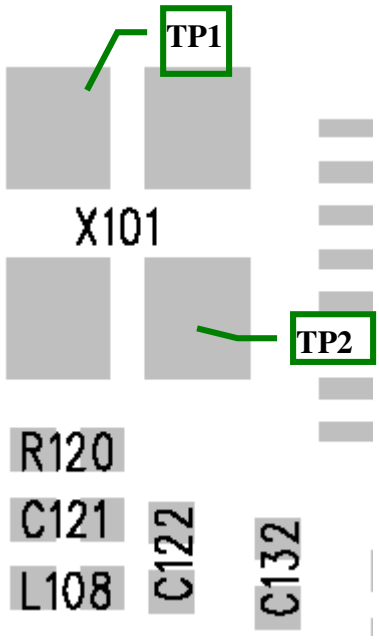
CIRCUIT

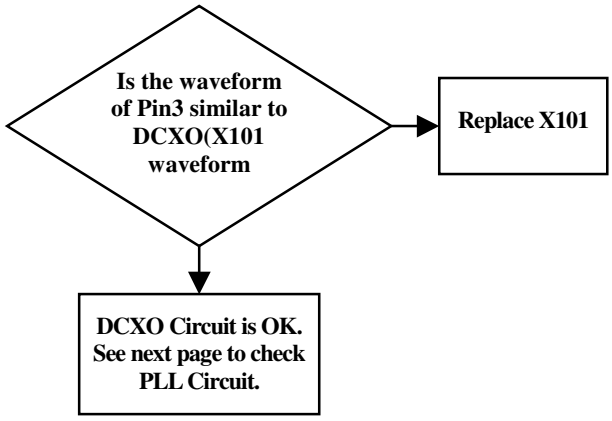

PA to Cutkey MATCHING
ANTENNA MATCHING
SKY77518-21
U101
JRF101
BANDSW_DCS
PA_EN
VAPC
VRF
GPIO31_BAND_SELECT
R136 15Kohm
R137 NC
Resistor Value
BAND
GPIO31 _BAND_SELECT
R136=15K R137=NC
900/1800
"HI"
R136=NC R137=100K
850/1900
"LOW"


AD6548/9
U103
U102
X101
B9308_EPCOS
26Mhz crystal use NDK EXS00A-CS01
Arima Comm
ALLY
Tuesday, Ma

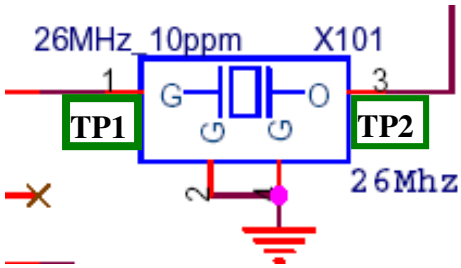
DCXO Trouble

TEST POINT	CHECKING FLOW

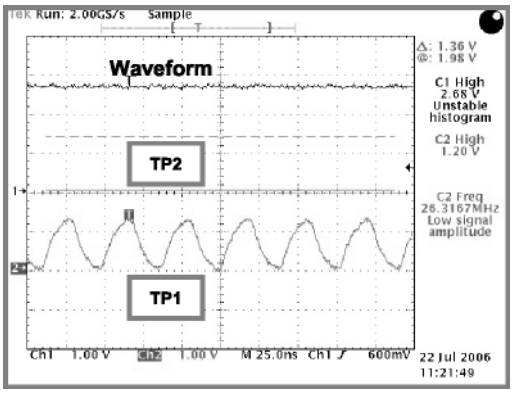




CIR CUIT

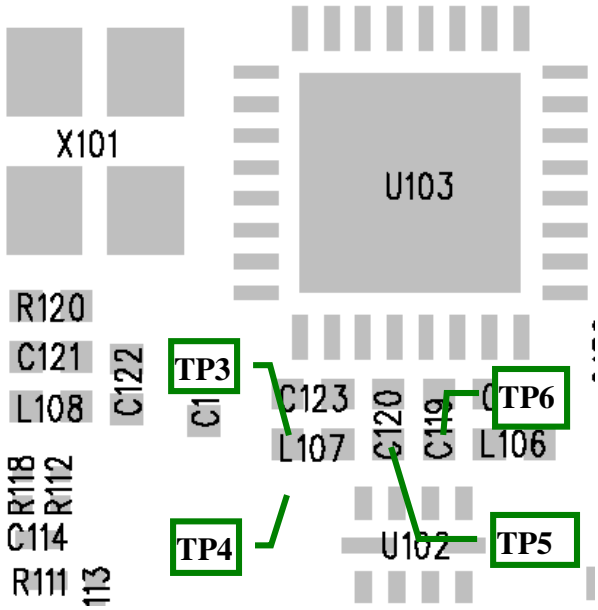


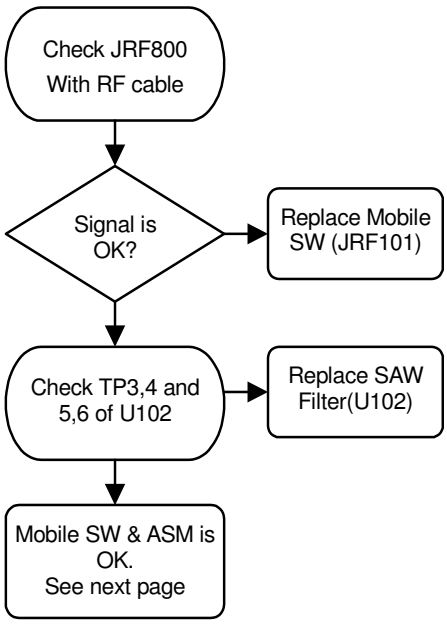
WAVE FORM



SAW Filter Trouble

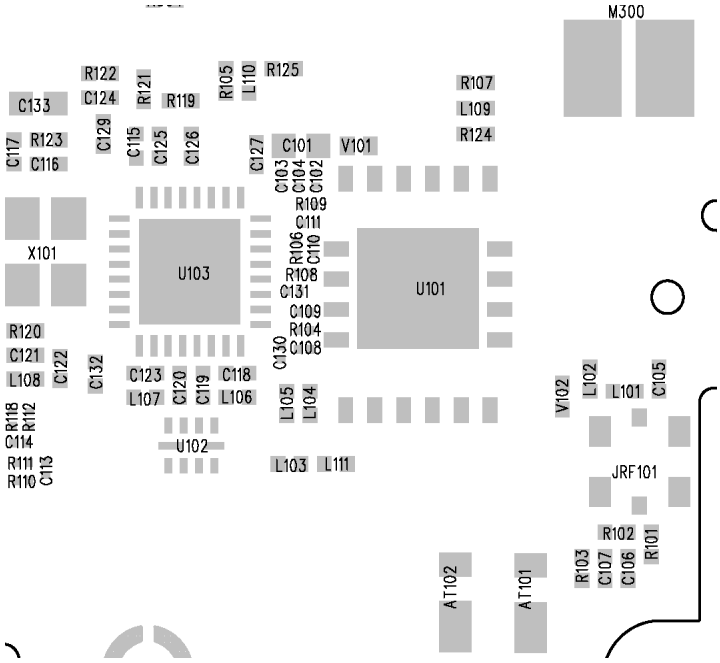
TEST POINT	CHECKING FLOW





TX Trouble

TEST POINT



CHECKING FLOW

Setup Test Equipment

Cell Power : -74d Bm

EGSM900 CH37

DCS1800 CH669

↓

CHECK POINT (U103)

↓

CHECK POINT PAM

CONTROL POINT

↓

CHECK ASM & MOBILE SW

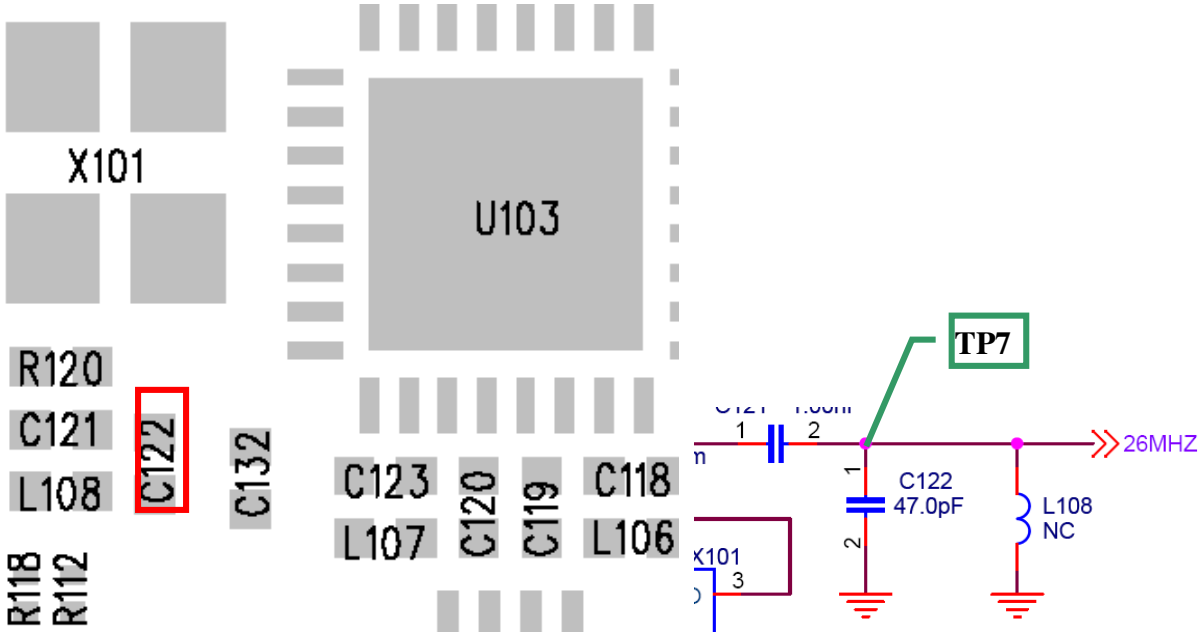
& SAW (JRF101,U102

↓

Re-Download S/W & RF

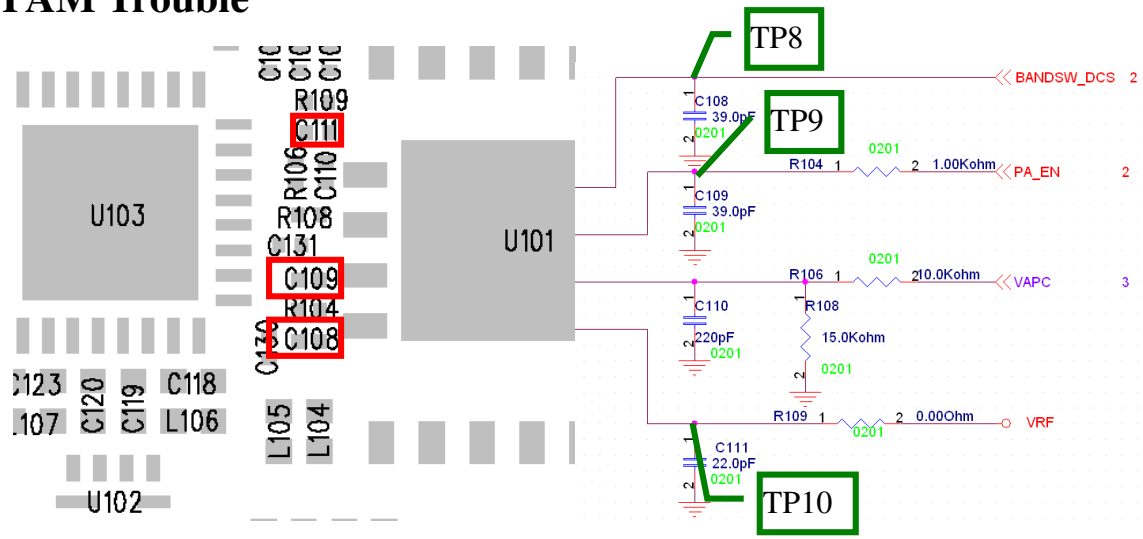
CAL

Transceiver trouble



TP7, there is 26MHz signal, check it.

PAM Trouble

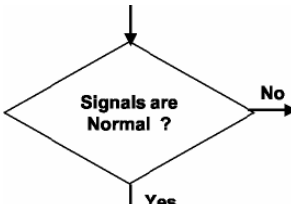


Signal configuration

Mode	EGSM900 TX	DCS 1800 TX	EGSM900 RX	DCS1800 RX
TXON_PA (TP9)	H(2.7V)	H(2.7V)	L	L
BS (TP8)	L	H(2.7V)	L	H(2.7V)
VLOGIC (TP10)	H(2.7V)	H(2.7V)	H(2.7V)	H(2.7V)

CHECKING FLOW

Check control signal (TP8,9,10)

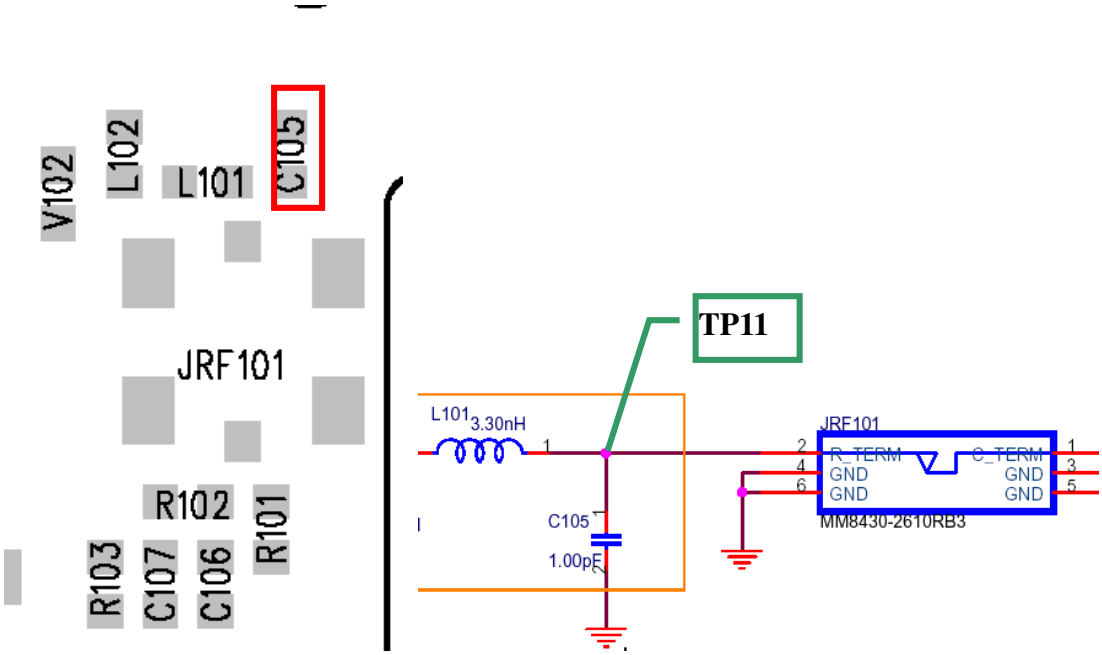


Check U103

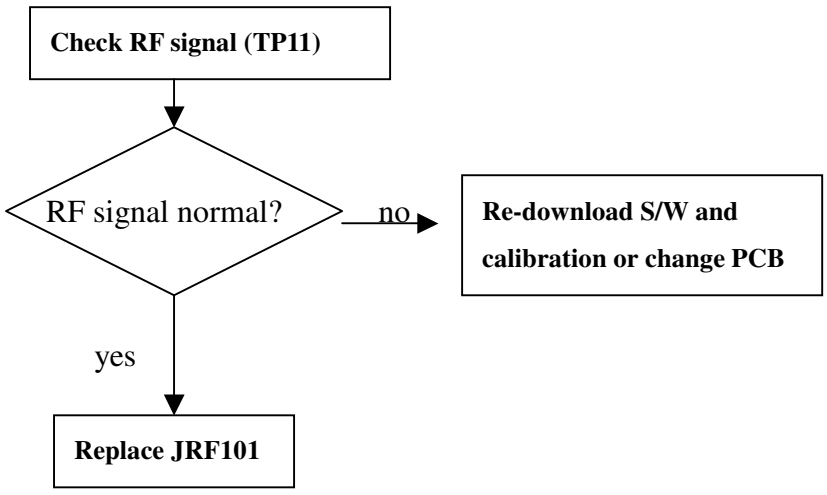
PAM Control Signal is OK?
See next page to check Mobile swich(sw) Circuit.

Mobile Switch Trouble

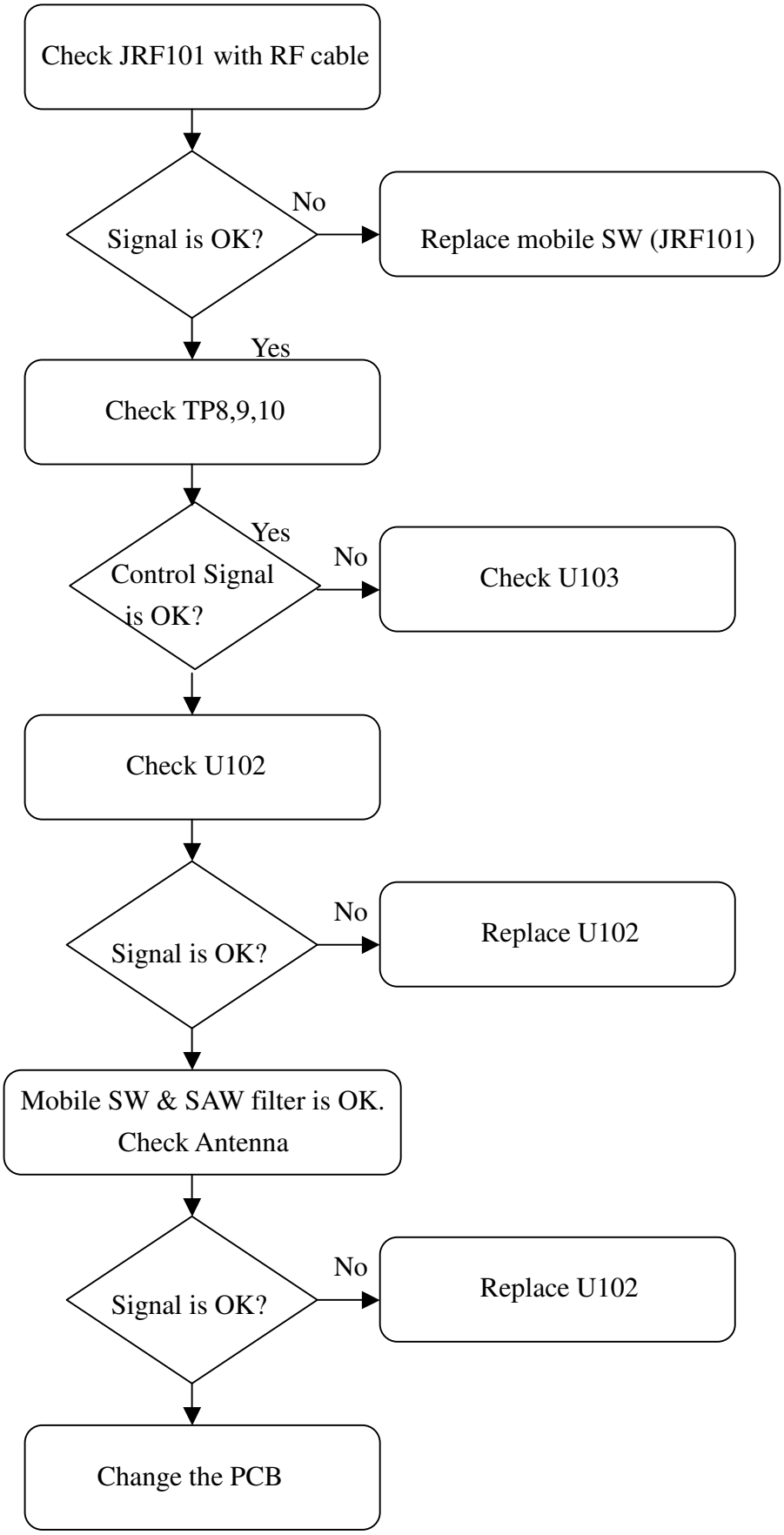
TEST POINT



CHECKING FLOW

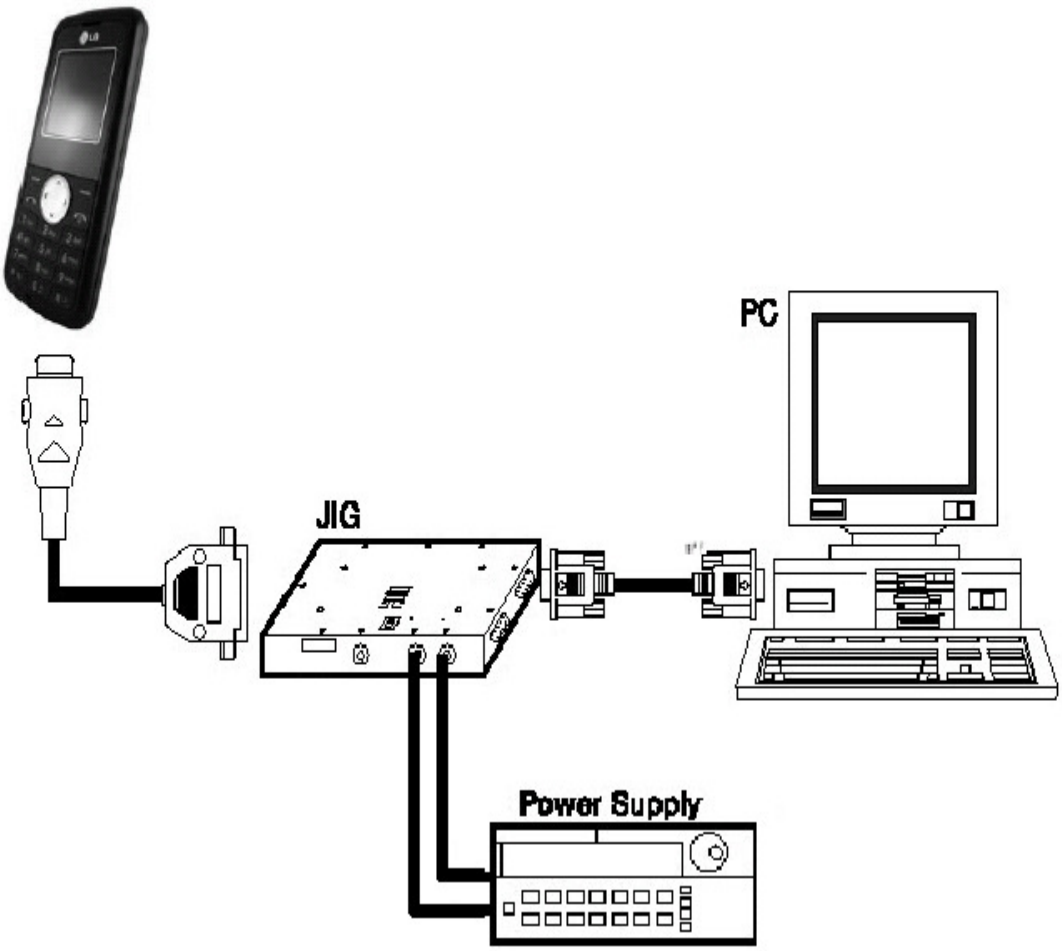


The full CHECKING FLOW of TX Trouble



5.DOWNLOAD

5.1 Download setup



5.2 Download Process

LEO Download Tool

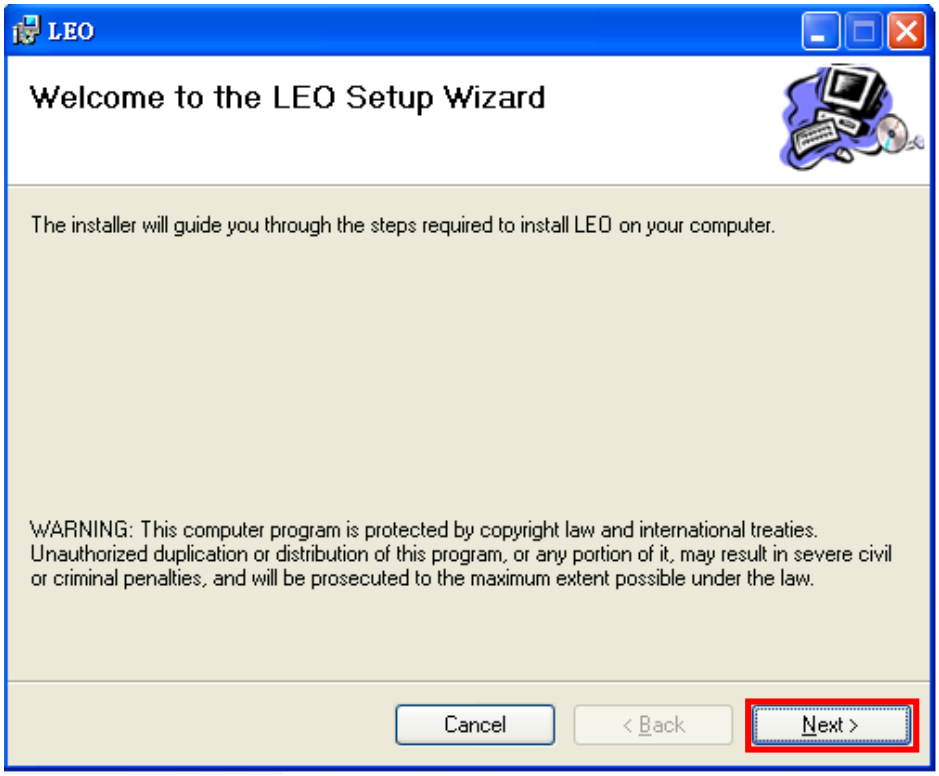
- **Tools**

1. Download cable(Prolific USB-to-Serial)
2. PC
3. Battery (3.8 V Li-ion Battery)

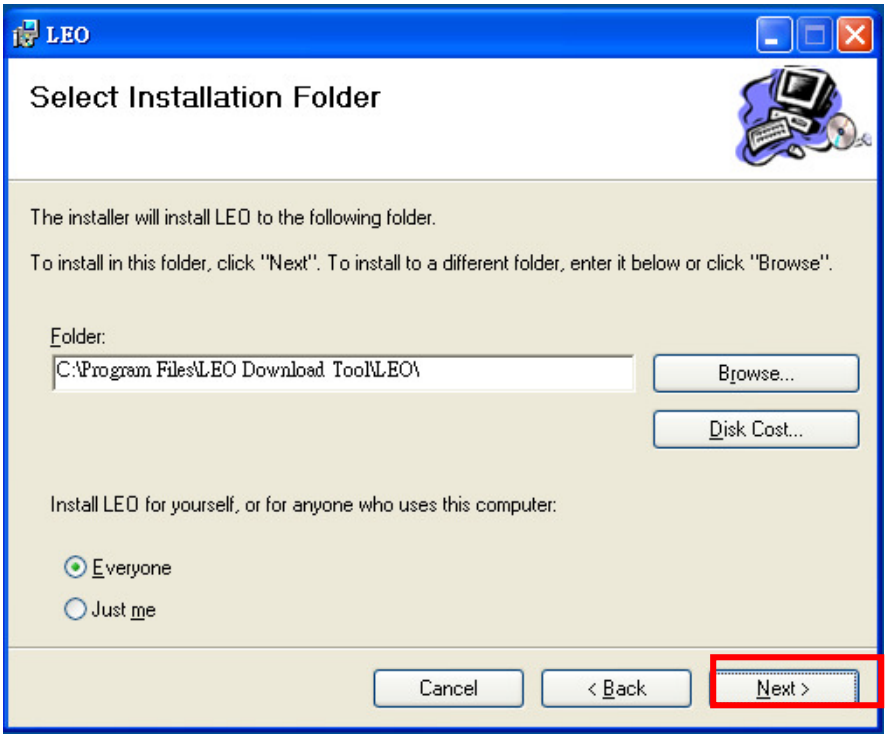
- **How to install Leo download tool**

1. You must install “Prolific USB-to-Serial Comm Port” driver first before installing this program, and then double click the “Setup.msi” start installation.

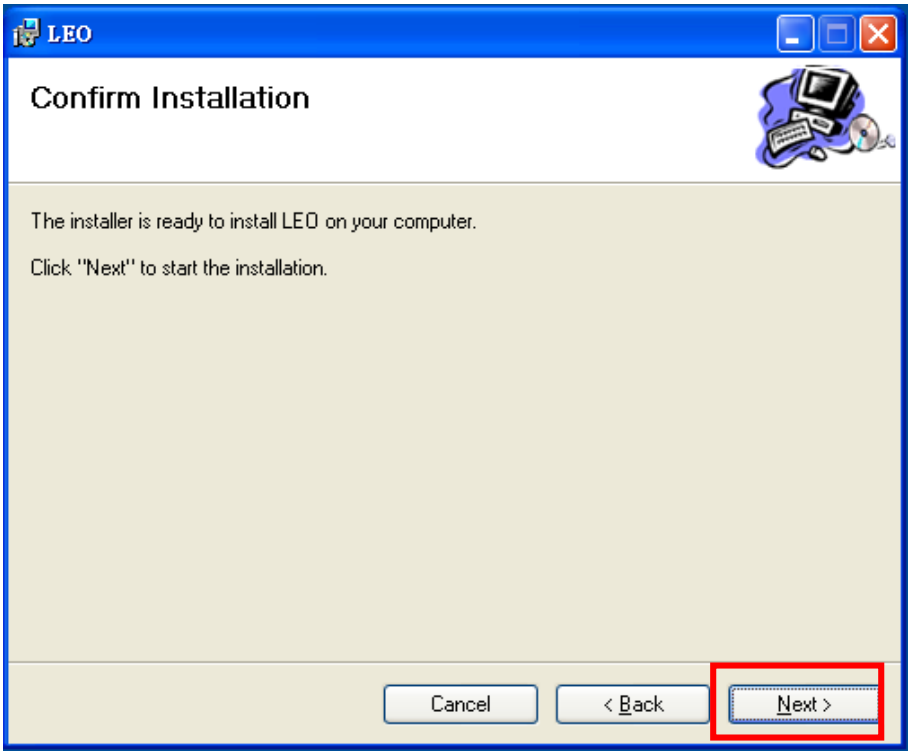
2.You can see the below picture, and then click the “Next” button.



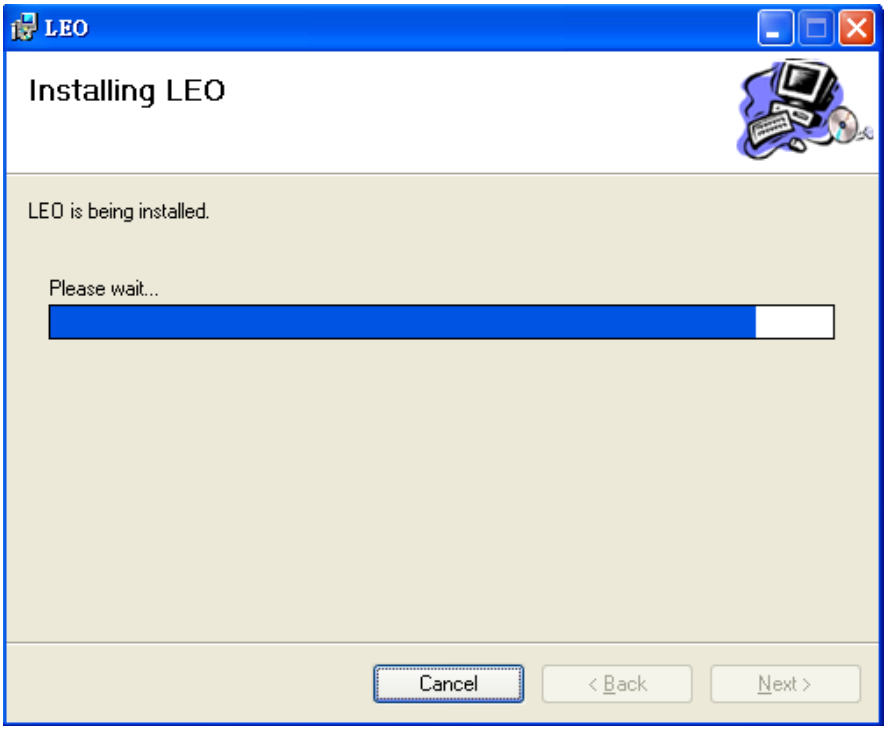
3.You can see the below picture, and then click the “Next” button.

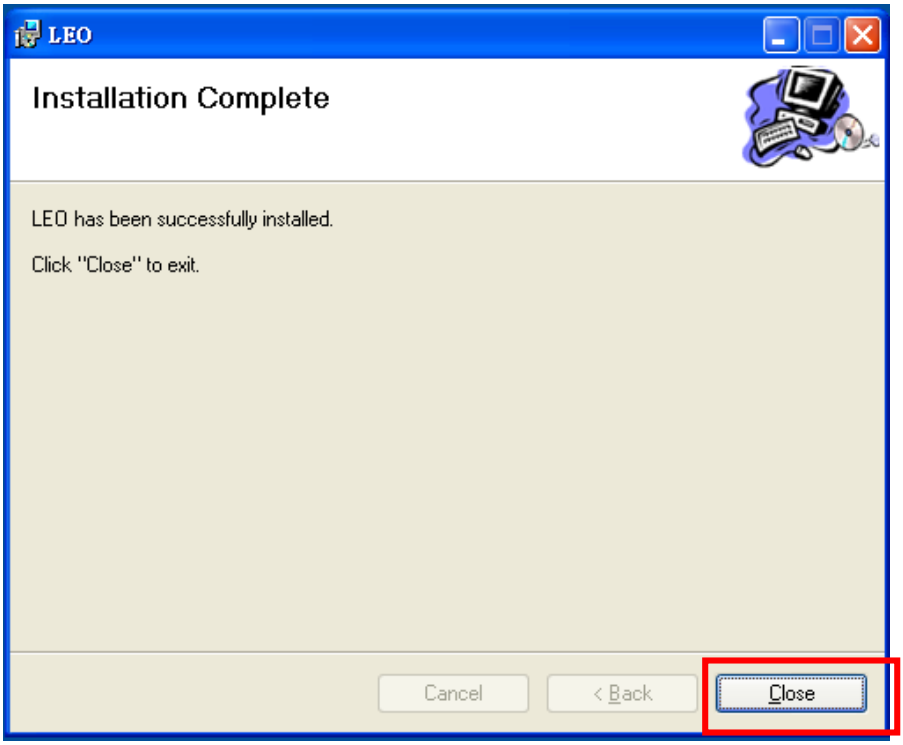


4. You can see the below picture, and then click the “Next” button.



5. You can see the below Installing picture, and then click the “Close” button installation complete.



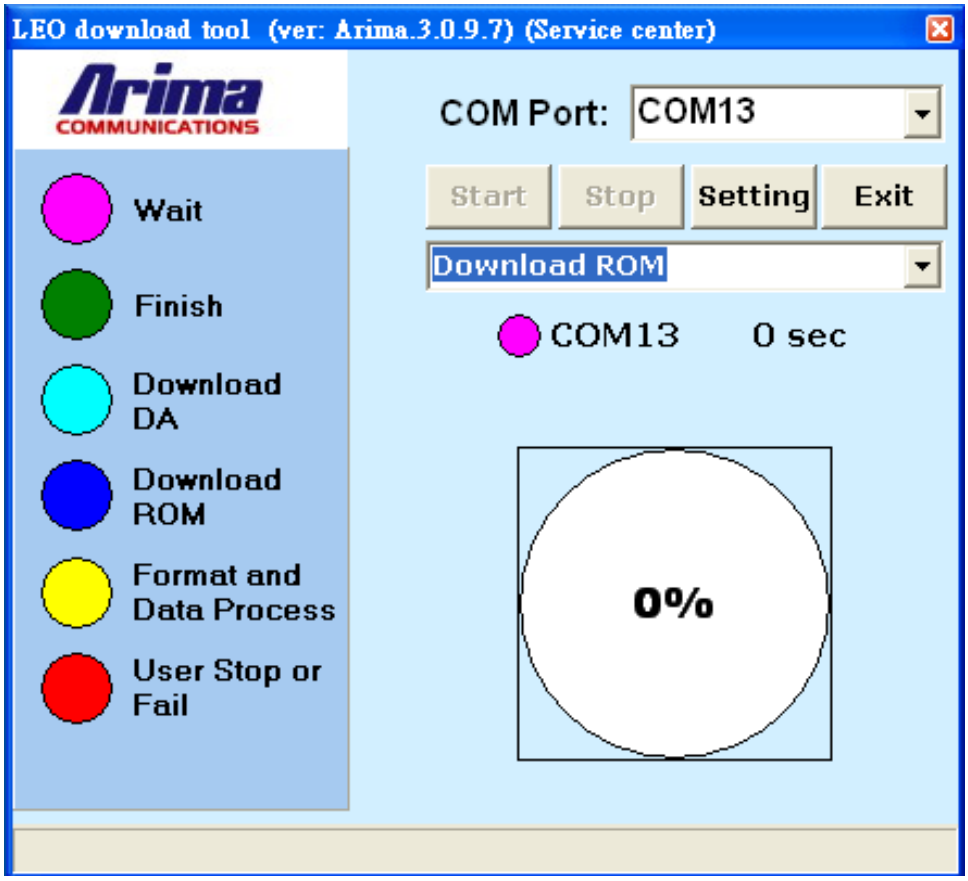


■ How to use Leo download tool

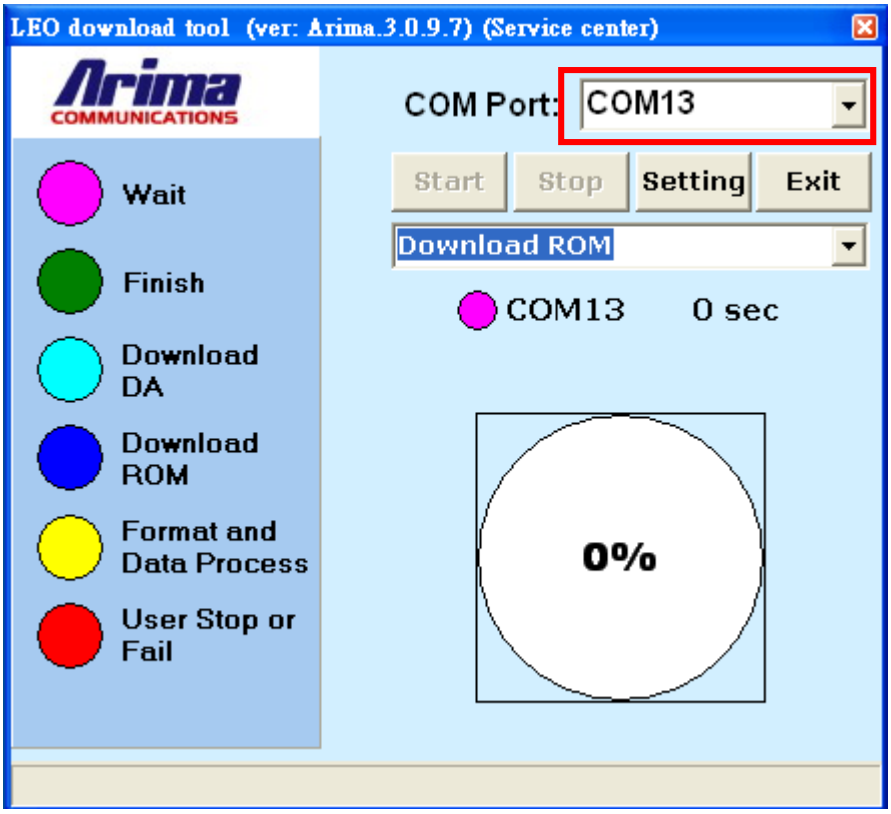
For example: GB160aOL-01-V10a-000-XXX-SEP-10-2009

1.Connect Download cable with computer, and then double click the" **LEO Download Tool**".

2.you can see the below picture.



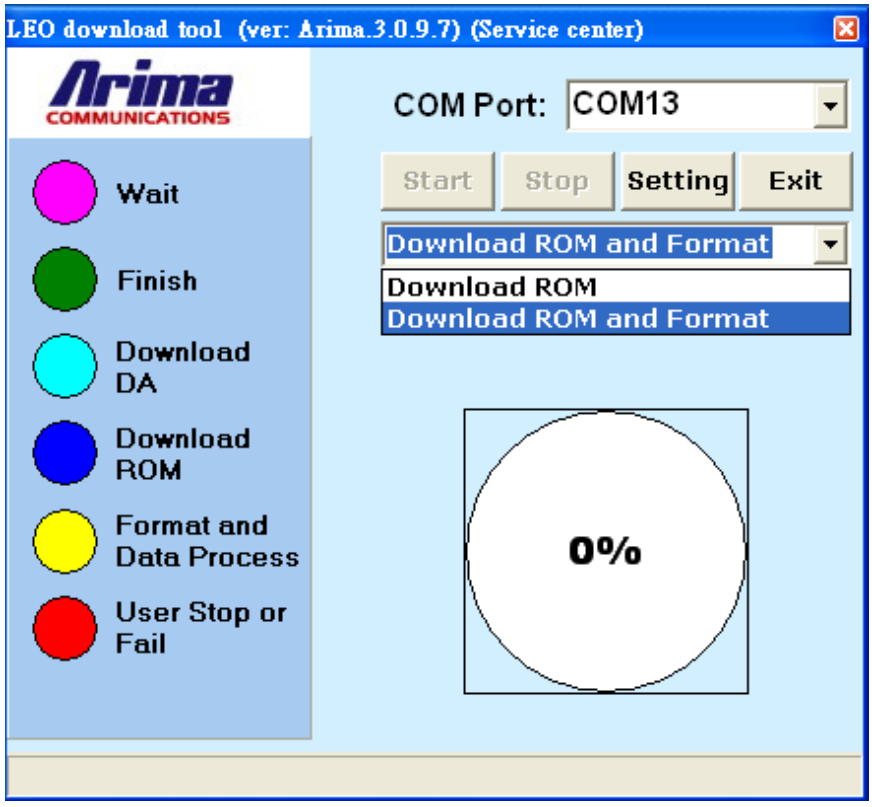
3.Select COM port (LEO will auto detect COM port)



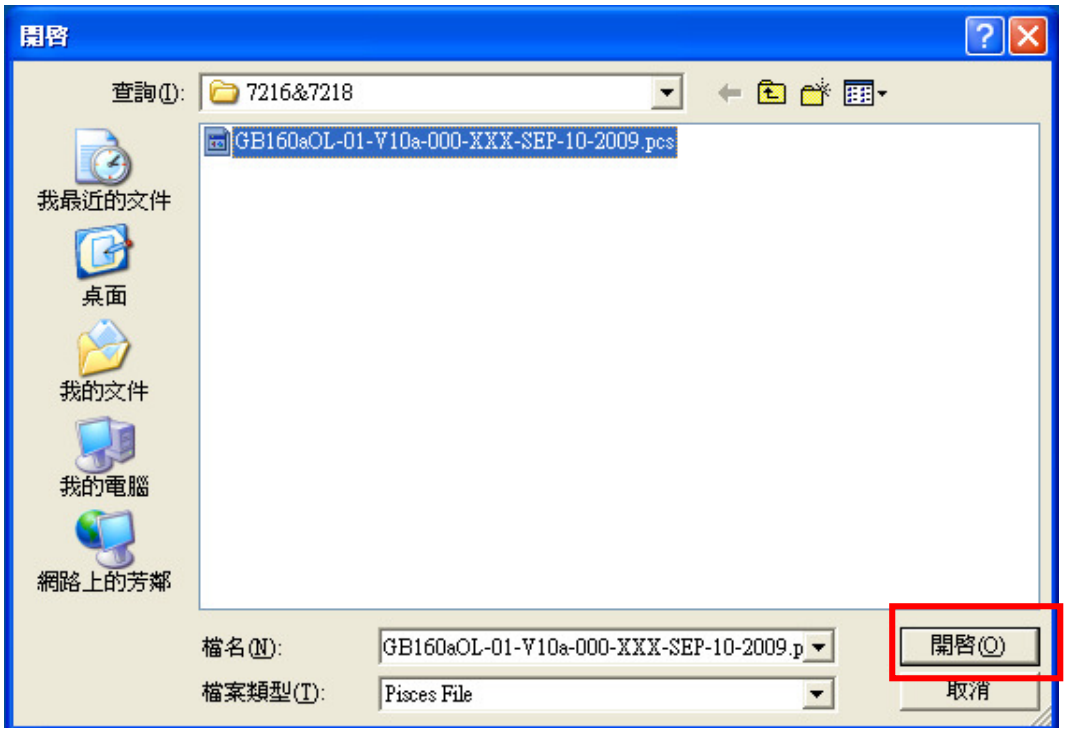
4.Select Download mode.

Note:① If you select "**Download ROM**", it will download software only.

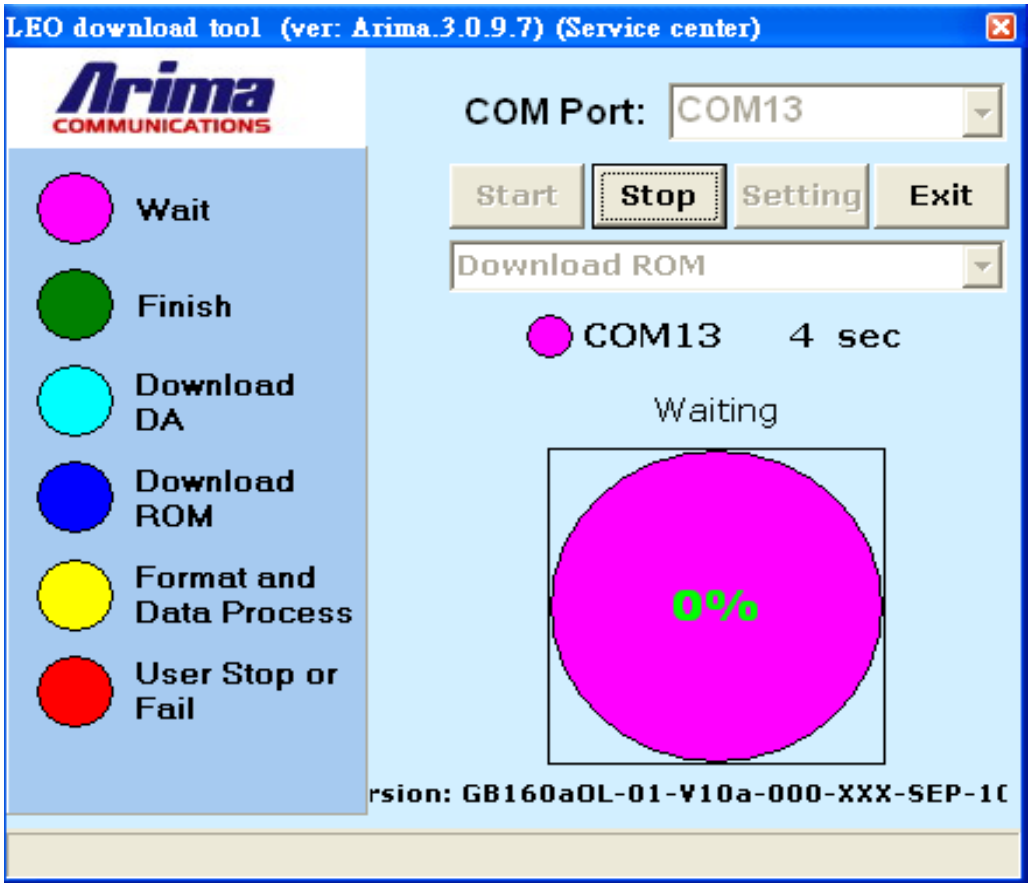
② If you select "**Download ROM and Format",** it will download software and delete NVRAM all data except calibration data and IMEI number, and delete user disk data include contact information 、message etc, also it still will reset META_NVRAM to factory default.



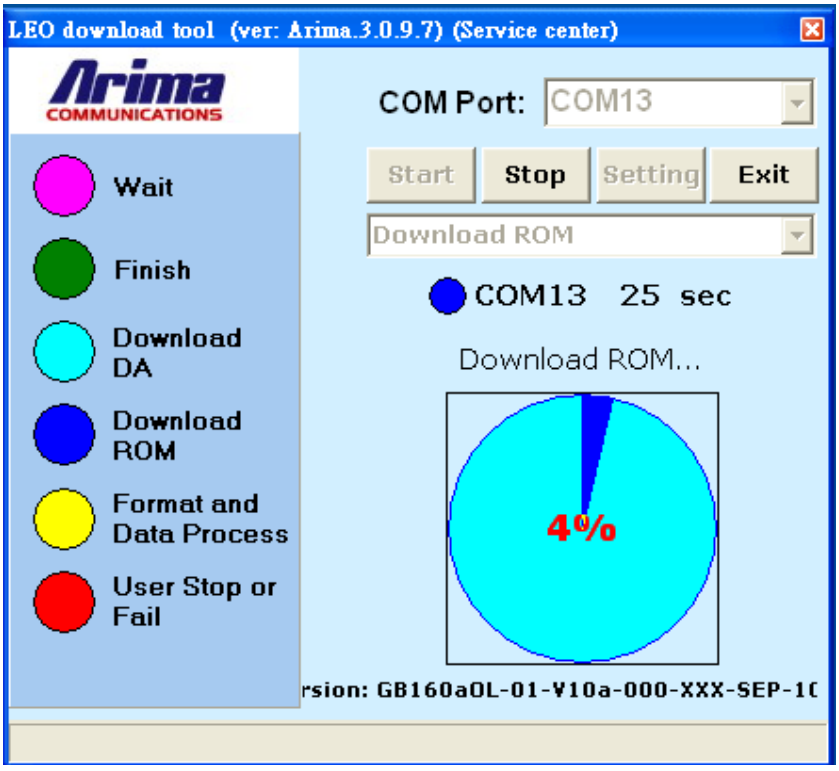
5.Click the “Setting” button and select a valid file. The file always be end of “.PCS”, reference below picture.



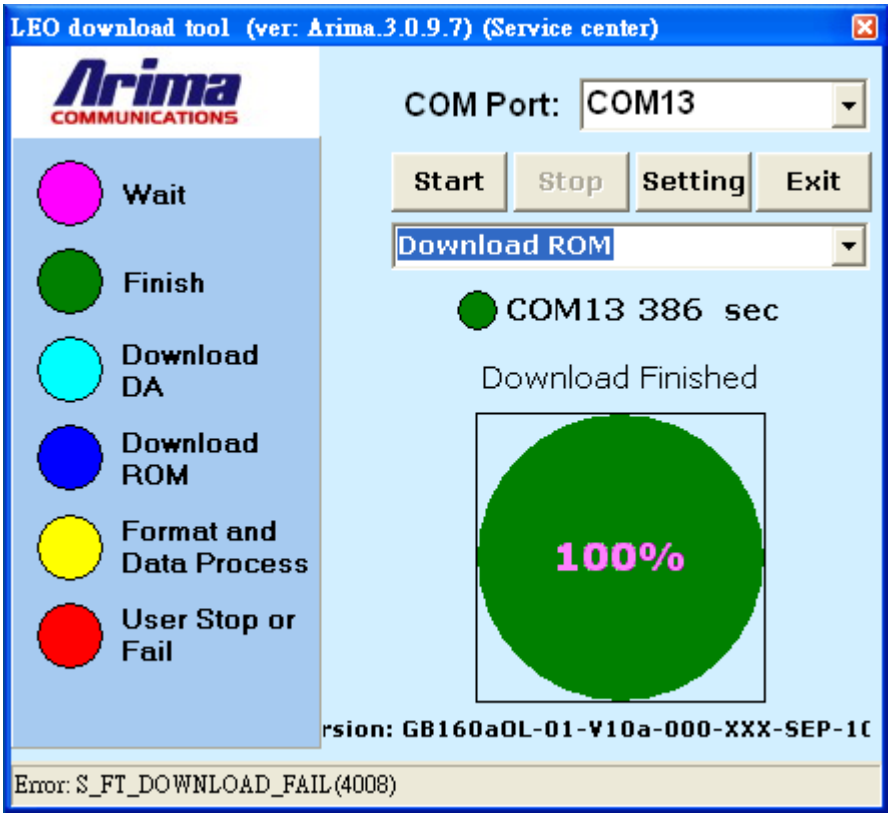
6.Select the “. PCS “file and press open, you can see following picture.



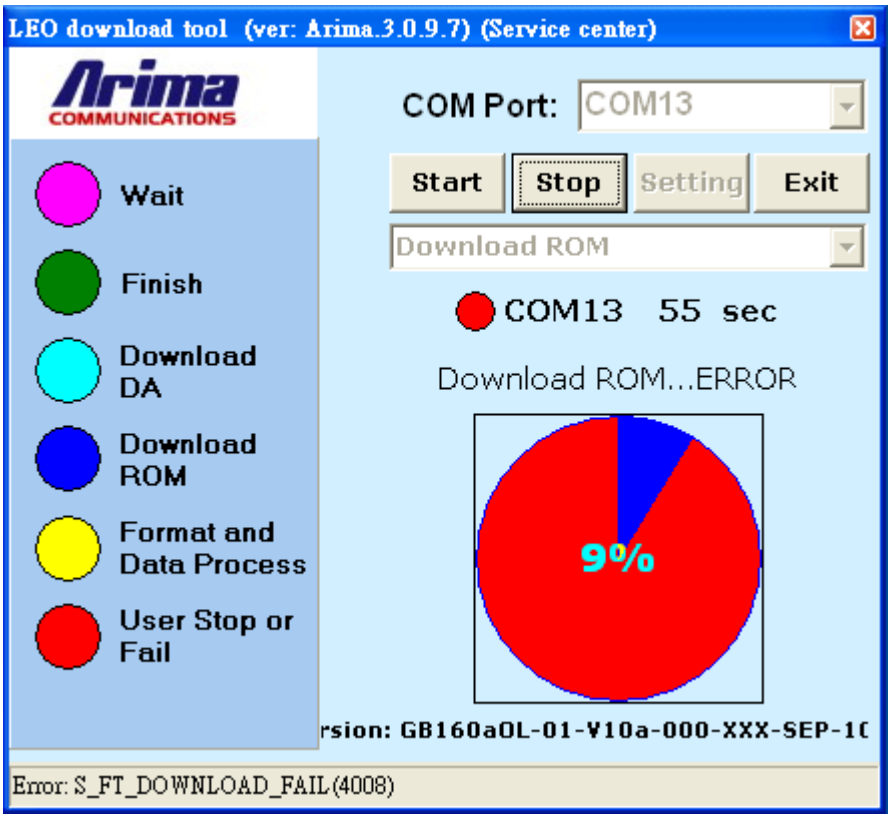
7.After you see the pink cycle, connect download cable with handset, and then press the power key , you will see below picture.



8.After reach to 100%, SW download finish.

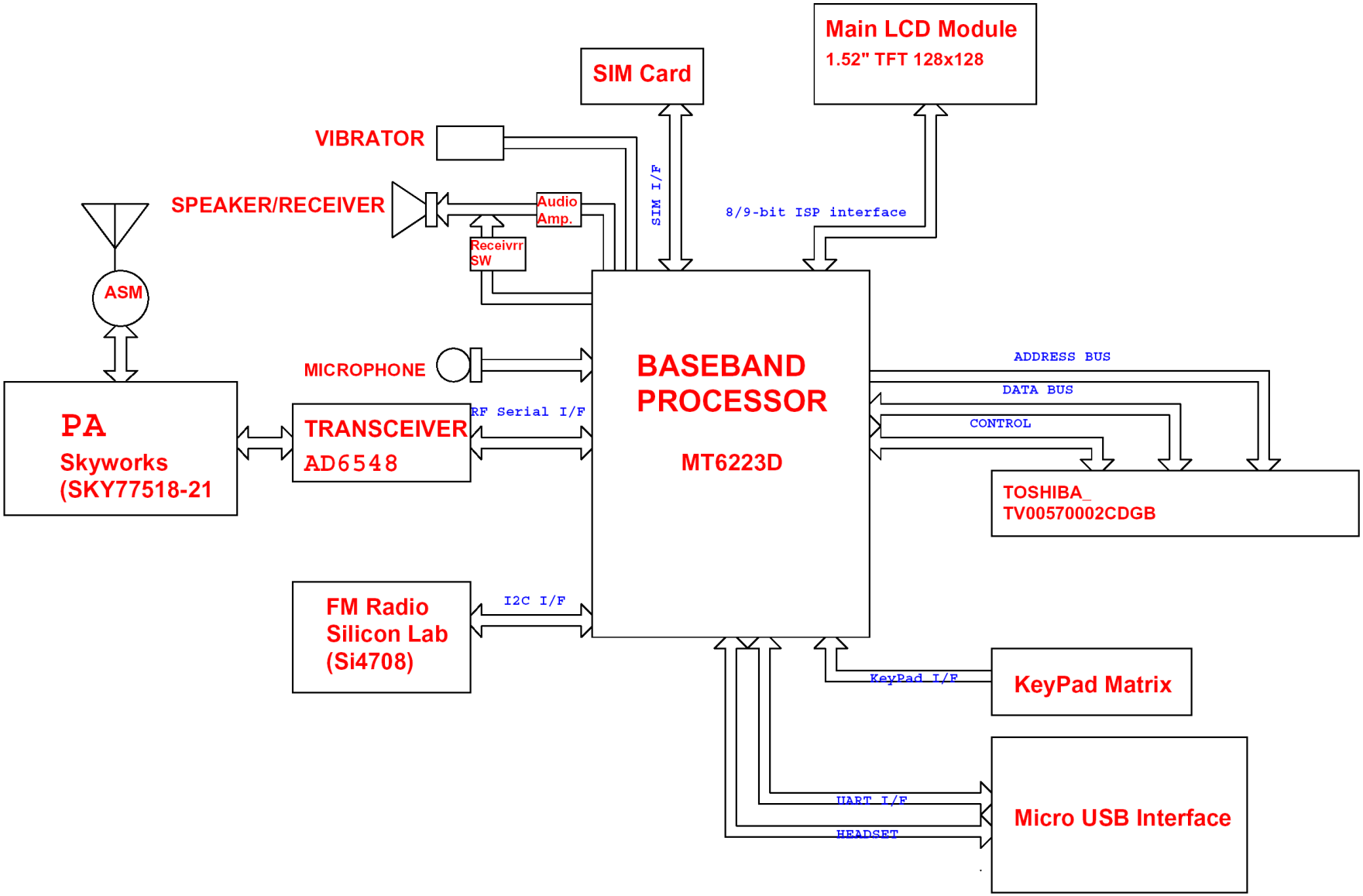


9.If download failed, you will see the below picture.



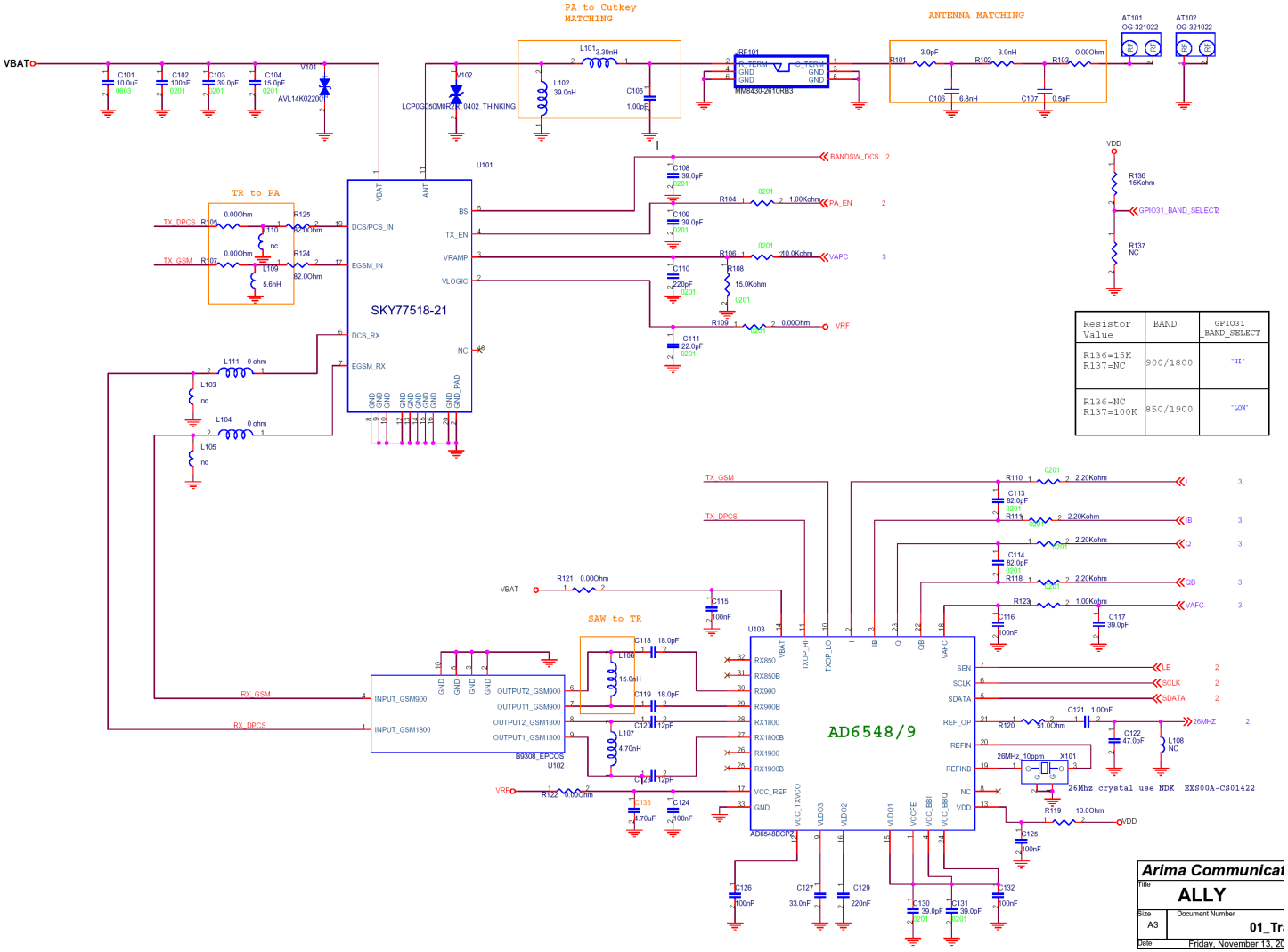
Attention: If appear failed image, Please try close LEO and try open again.

6. BLOCK DIAGRAM

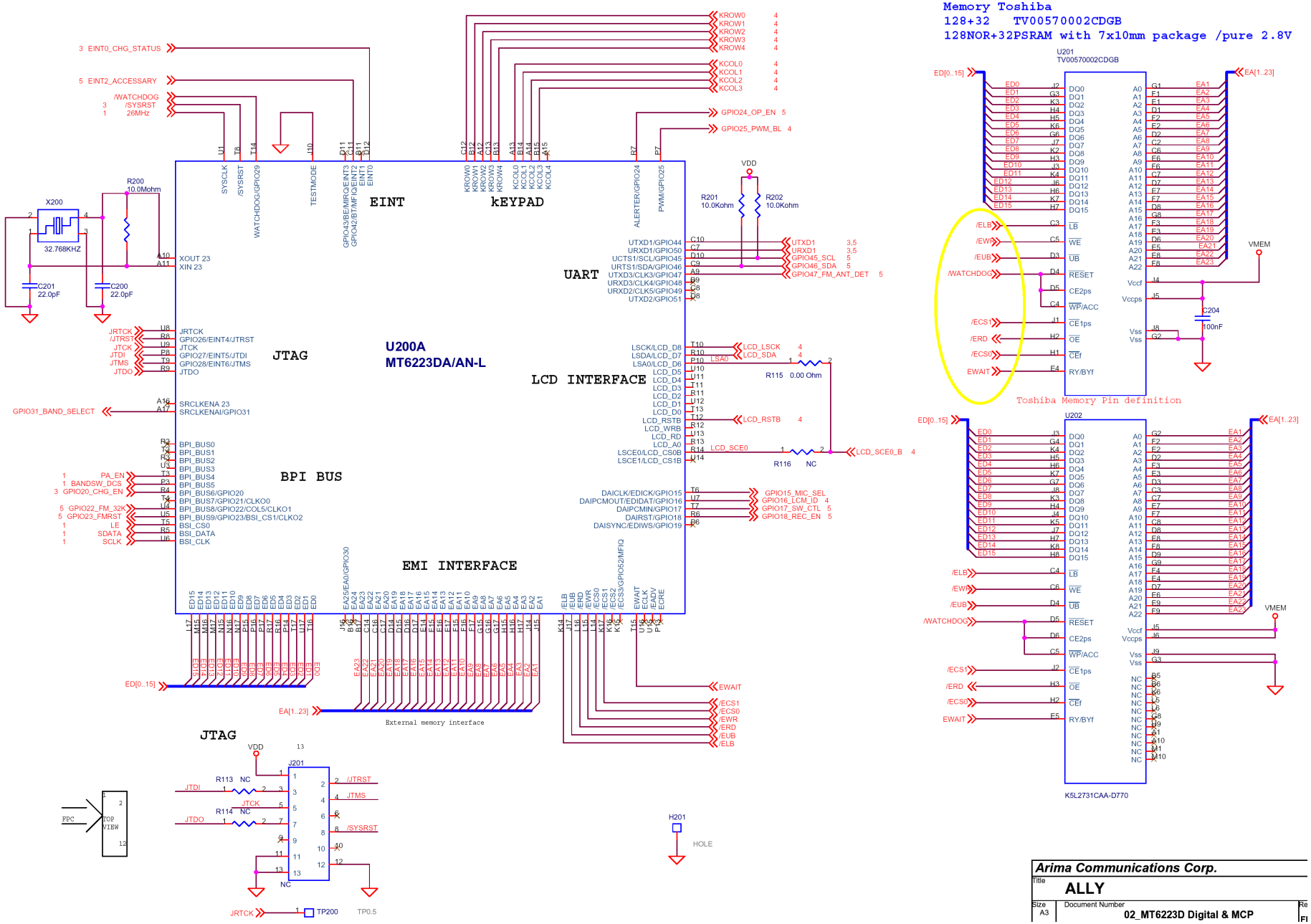


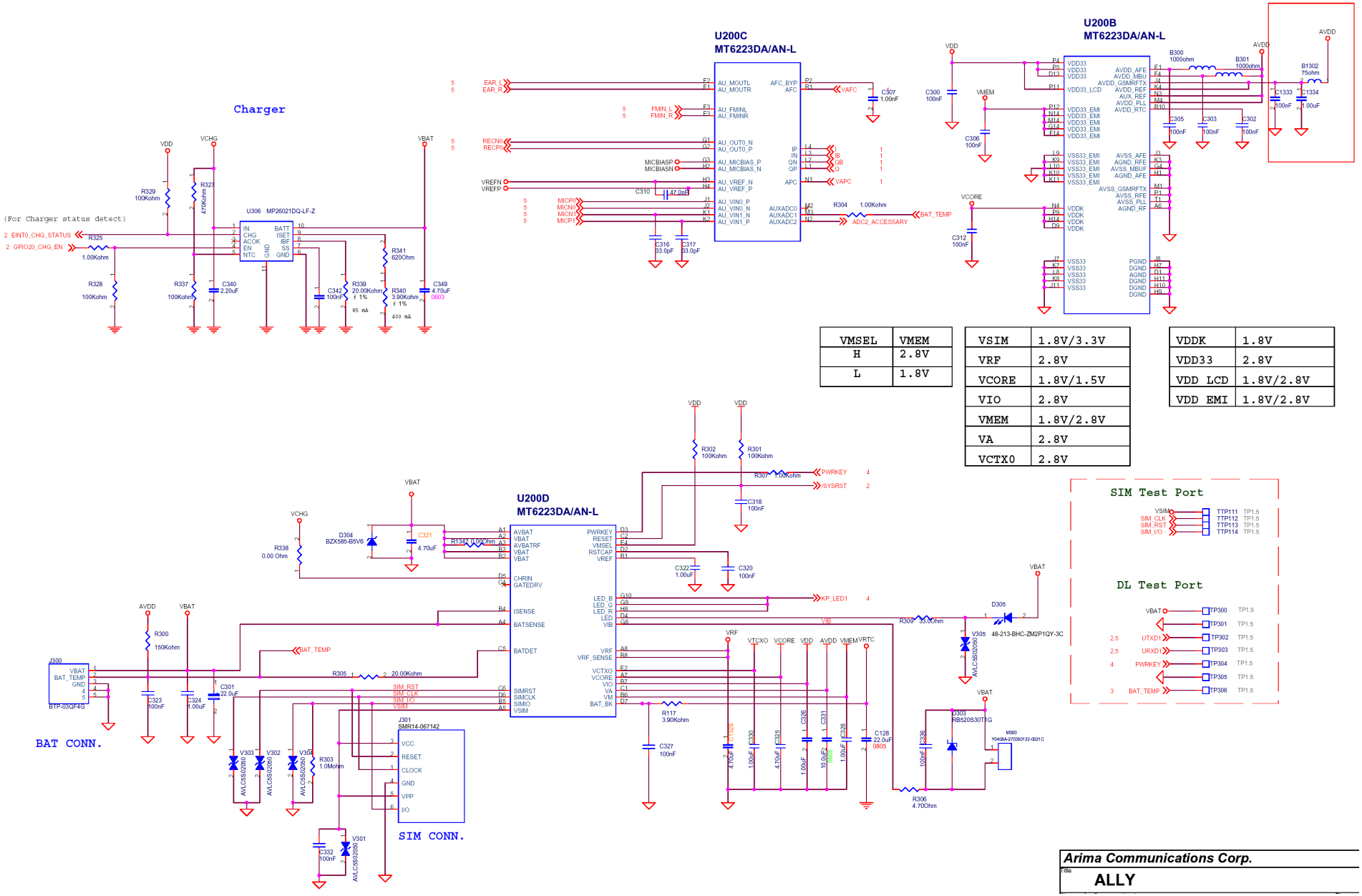
7. CIRCUIT DIAGRMA

	PA to Cutkey MATCHING	ANTENNA MATCHING	PA	SAW	TR to PA	SAW to TR
US(850/1900)	L102=39nH L101=2.2nH C105=1pF	R101=12pF R102=3.3nH R103=0 ohm C106=8.2nH C107=0.3pF	U800= SKY77517-21	U900= B9310_EPCOS	L110=4.7nH L109=NC	L106=18nH
EU(900/1800)	L102=39.0nH L101=3.3nH C105=1.0pF	R101=3.9pF R102=3.9nH R103=0 ohm C106=6.8nH C107=0.5pF	U800= SKY77518-21	U900= B9308_EPCOS	L110=NC L109=5.6nH	L106=15nH



Resistor Value	BAND	GPIO31 _BAND_SELECT
R136=15K R137=NC	900/1800	"HI"
R136=NC R137=100K	850/1900	"LOW"

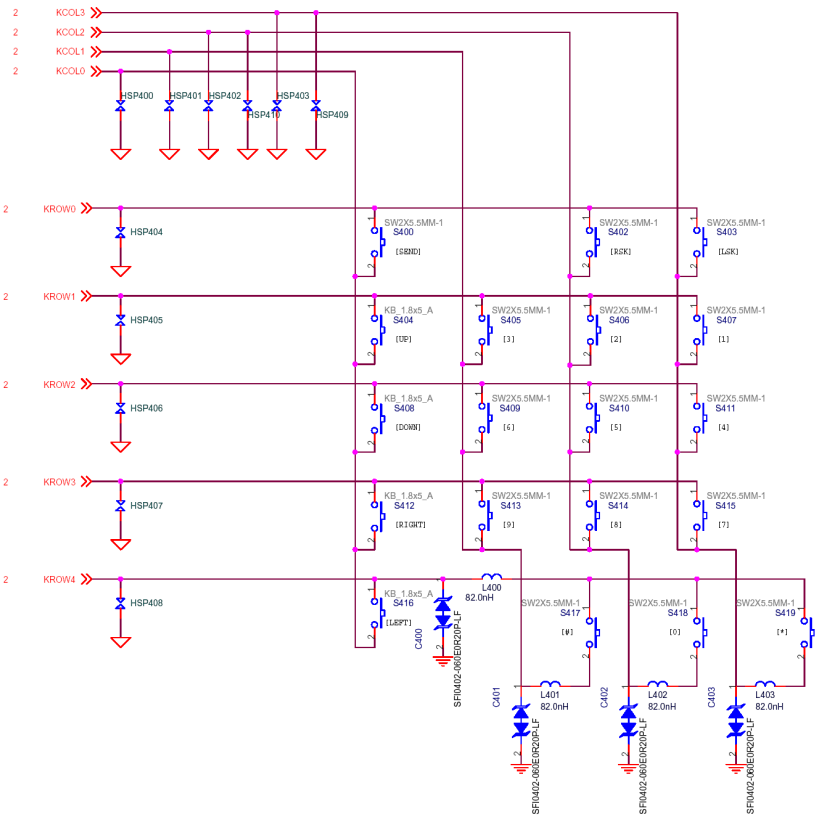

Memory Toshiba
128+32 TV00570002CDGB
128NOR+32PSRAM with 7x10mm package /pure 2.8V
U201
TV00570002CDGB
Toshiba Memory Pin definition
U202
K5L2731CAA-D770
U200A
MT6223DA/AN-L
EINT
kEYPAD
UART
JTAG
LCD INTERFACE
BPI BUS
EMI INTERFACE
External memory interface
JTAG
X200
32.768KHZ
C201 22.0pF
C200 22.0pF
R200 10.0Mohm
R201 10.0Kohm
R202 10.0Kohm
R115 0.00 Ohm
R116 NC
R113 NC
R114 NC
C204 100nF
VDD
VMEM
FPC
TOP VIEW
H201
HOLE
TP200
TP0.5
Arima Communications Corp.
Title
ALLY
Size
A3
Document Number
02_MT6223D Digital & MCP



VMSEL	VMEM
H	2.8V
L	1.8V

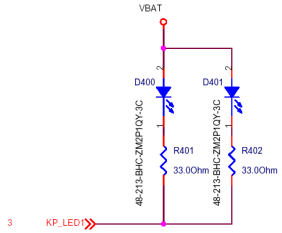
VSIM	1.8V/3.3V
VRF	2.8V
VCORE	1.8V/1.5V
VIO	2.8V
VMEM	1.8V/2.8V
VA	2.8V
VCTX0	2.8V

VDDK	1.8V
VDD33	2.8V
VDD_LCD	1.8V/2.8V
VDD_EMI	1.8V/2.8V

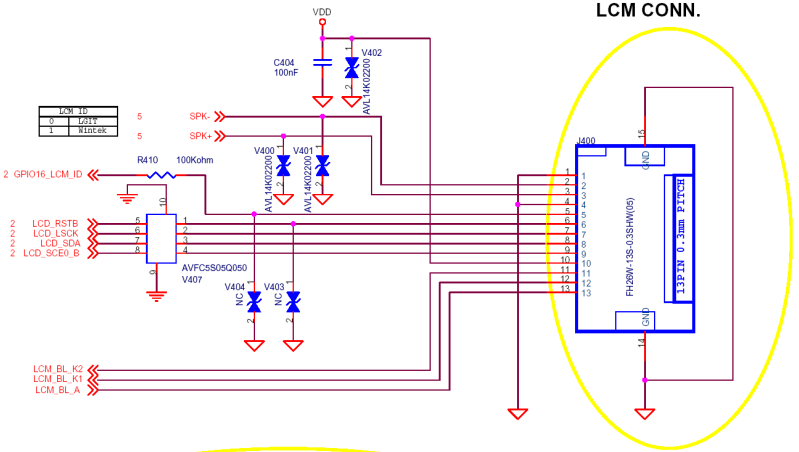


PWRKEY

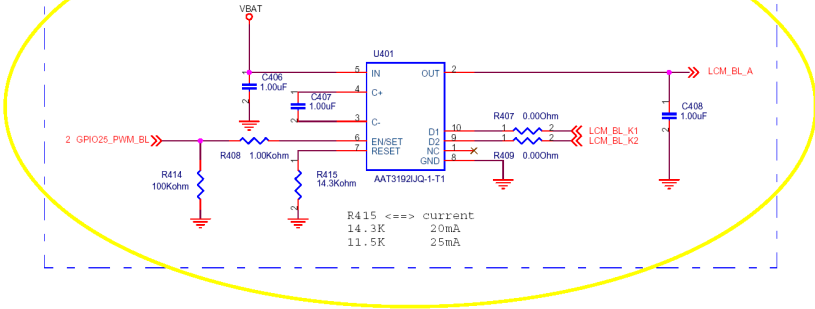
Keypad LED

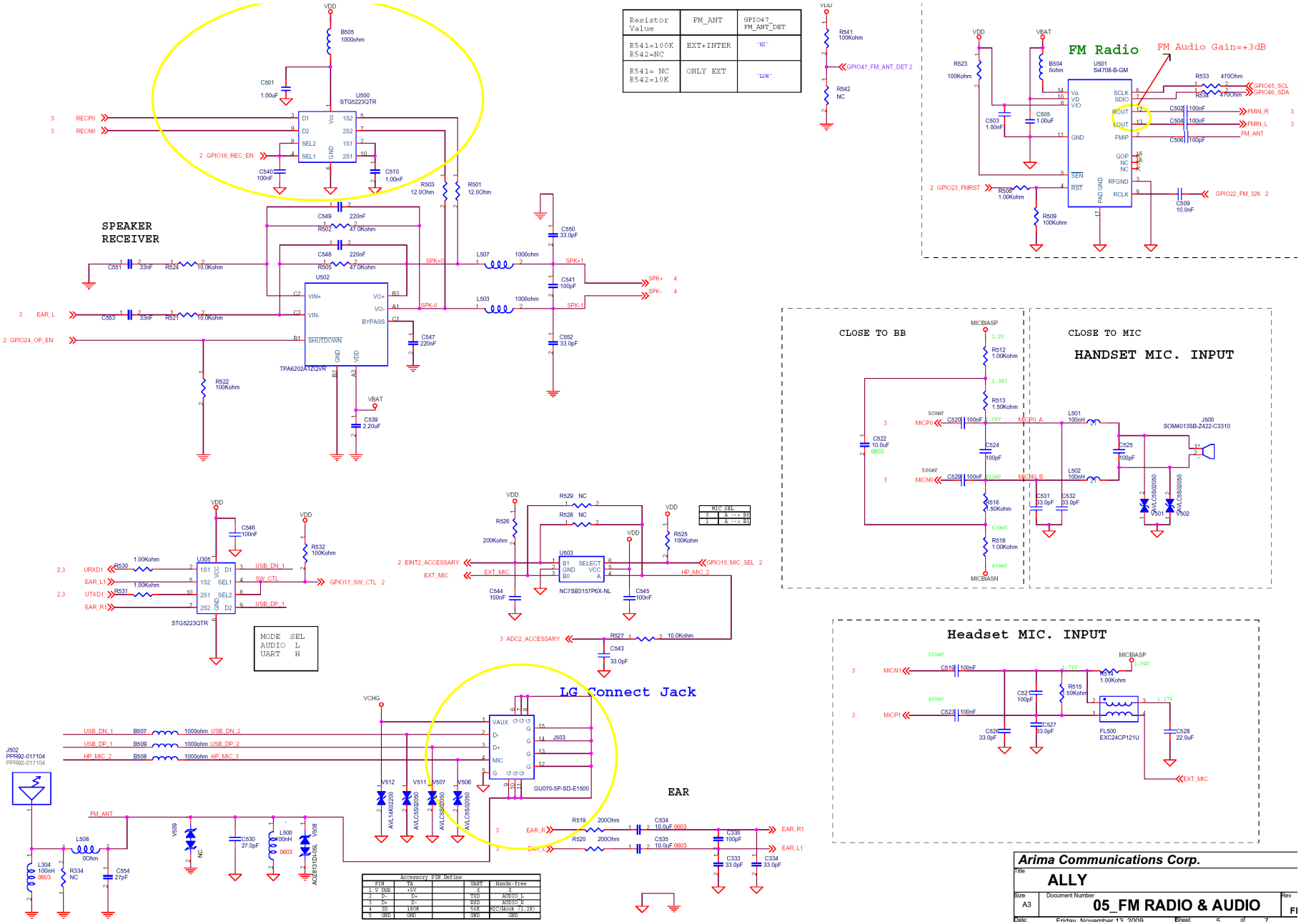


LCM CONN.



LCD Backlight



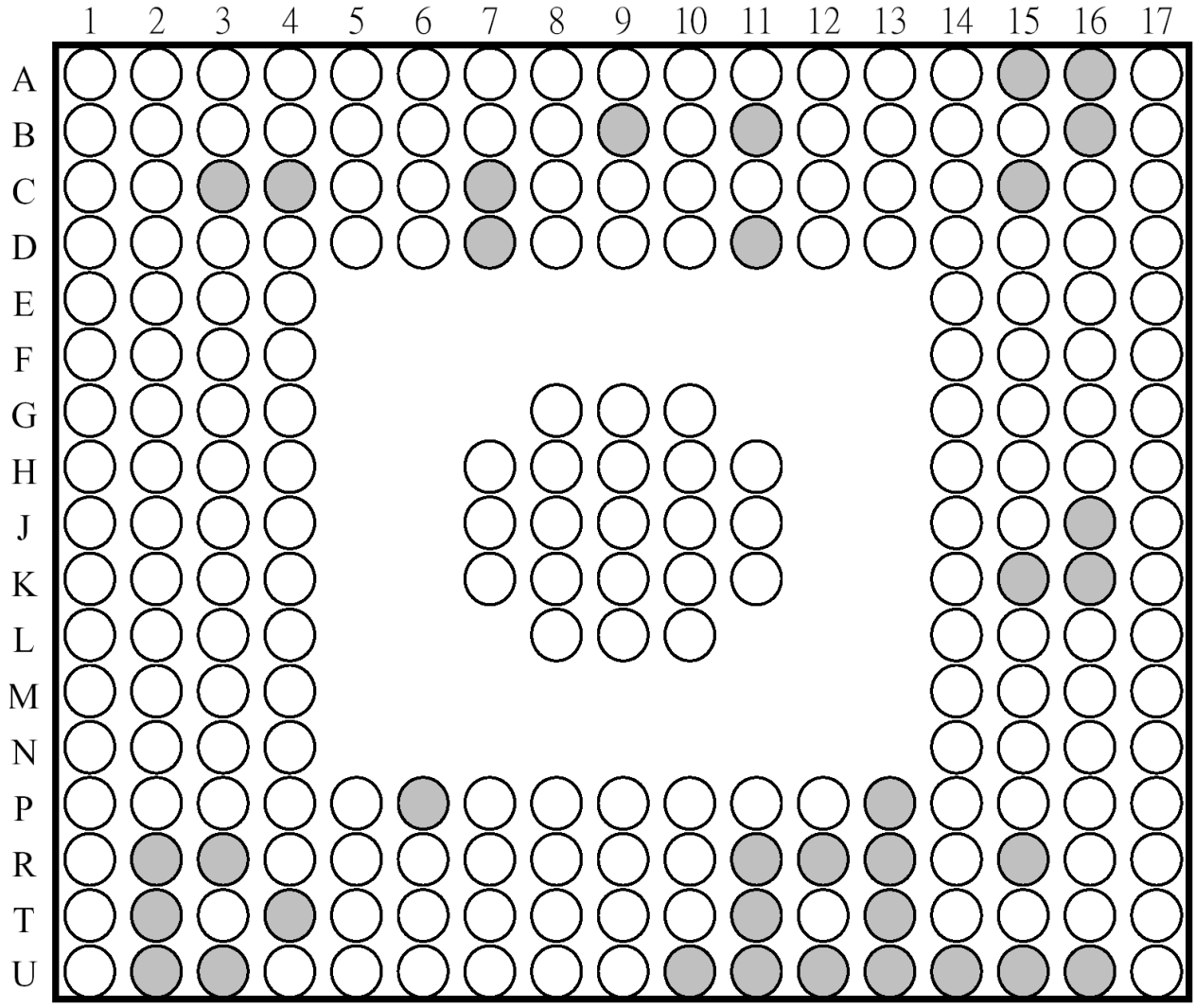


Resistor Value	FM_ANT	GPIO47_FM_ANT_DET
R541=100K R542=NC	EXT+INTER	"HI"
R541= NC R542=10K	ONLY EXT	"LOW"

8. BGA IC PIN Check

8.1 BGA PIN Check of main chip (MT6223)

BB_MT6223 (U200)

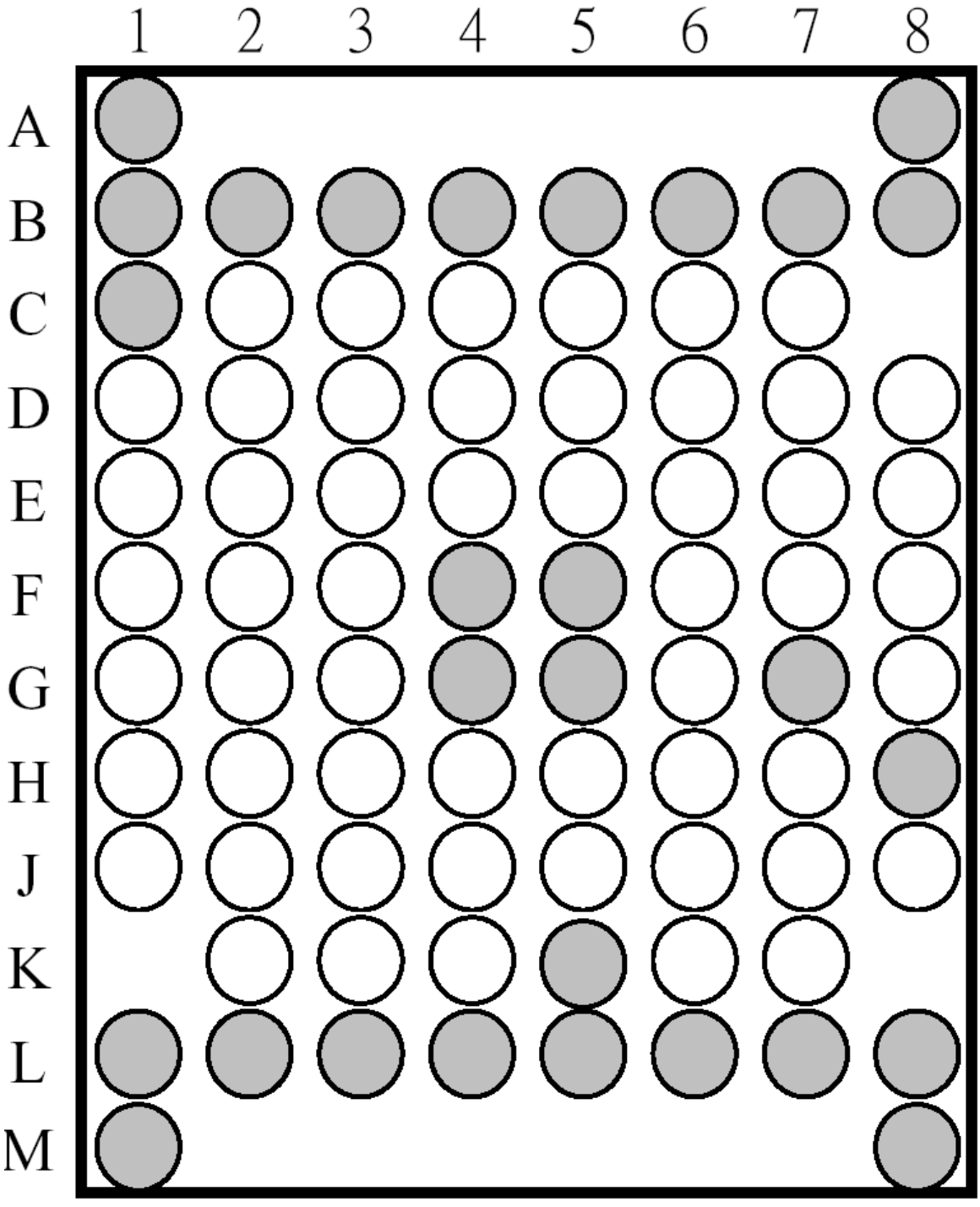


BGA use

BGA non-us

8.2 BGA PIN Check of Memory (PF38F4050M0Y0CG)

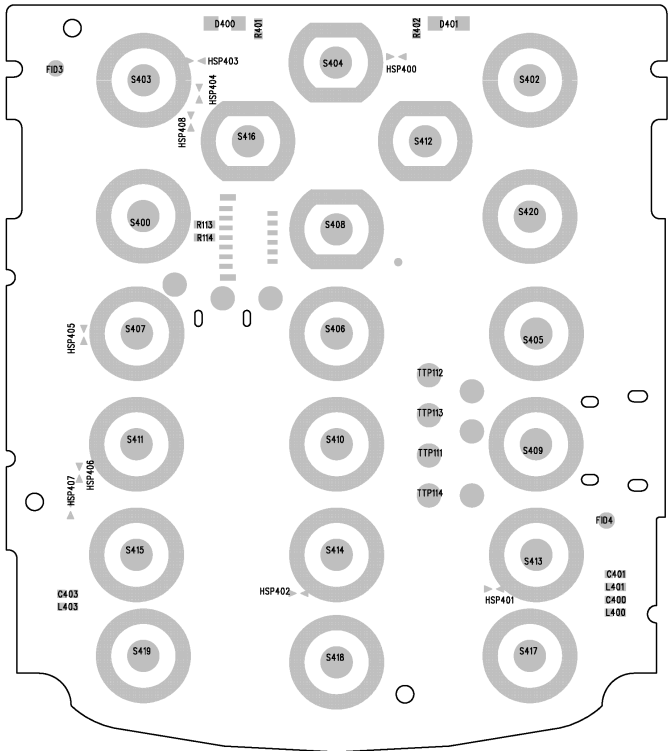
TV00570002CDGB (U201&U202)



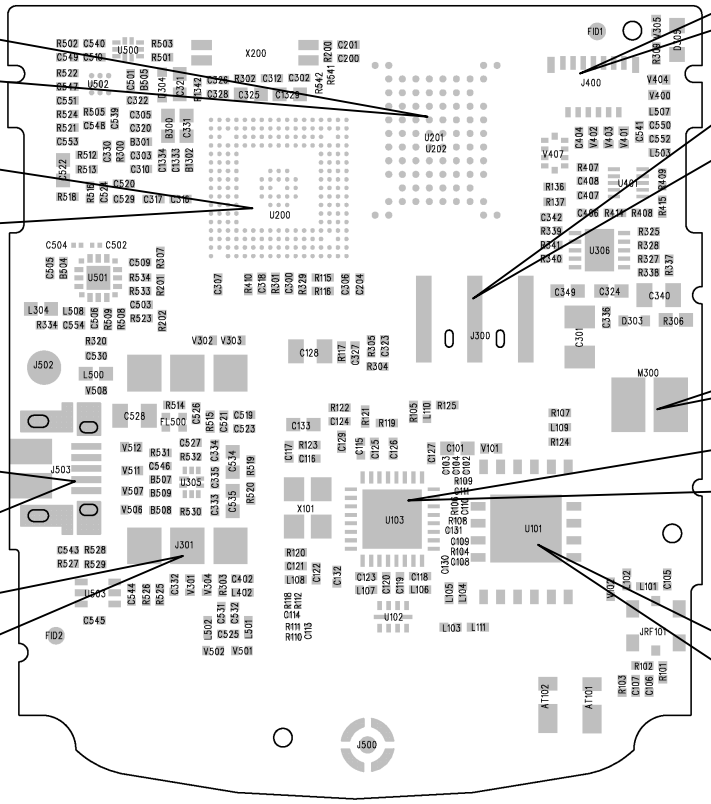
BGA use

BGA non-use

9. PCB LAYOUT



TOP



Bottom

U202&U201
Memory
No Booting

U200 BB chipset
(MT6223)
No power on
No service etc

J503
I/O connecter
No charging etc

J301
SIM connecter
No SIM

J400 LCM connector
No display

J300 Battery Connector
No Charging
No Power On

M300
Vibrator PAD
No Vibrator

U103 Transceiver
(AD6548)
No network

U101 (SKY77517)
No TX & No RX

10.Engineering Mode

1. Test purpose

a) To verify Appearance by visual check

b) To verify recognition of SIM card

c) To verify Function Test in the table shown as below

d) To verify power down phone

2. Test System

1.Power Supply Unit (PSU)+Dummy Battery or Battery
2.Test SIM Card (Spec: GSM Phase 2+ Test SIM Standard 1(3.1))
3.Sample Hands free Kit (SHF, Stereo)

3. Test Procedure

3.1 Appearance Test

Verify appearance by visual check

3.2 SIM Test

Verify recognition of SIM card

If “Insert SIM” indicated on Display, it is NG.

3.3 Enter Service Mode

3.3.1 No SIM Card installed

a. Power on Phone
b. Press **878** to enter service mode.

3.3.2 SIM Card installed

a. Power on Phone
b. Press ***#878#** to enter service mode.

3.3.3 Software Version Check

Select item 8 “Version” in Factory mode to check software version.

4. MMI Tests

Auto test
SHOW, IMEI, SW Version
Echo Loop
ANTENNA TEST
Version
Keypad
Vibrator
Loud Spk
Ring Tone
LED
LCD
Receiver
ADC
Charger
Headset
RTC
MTBF
UART
Radio

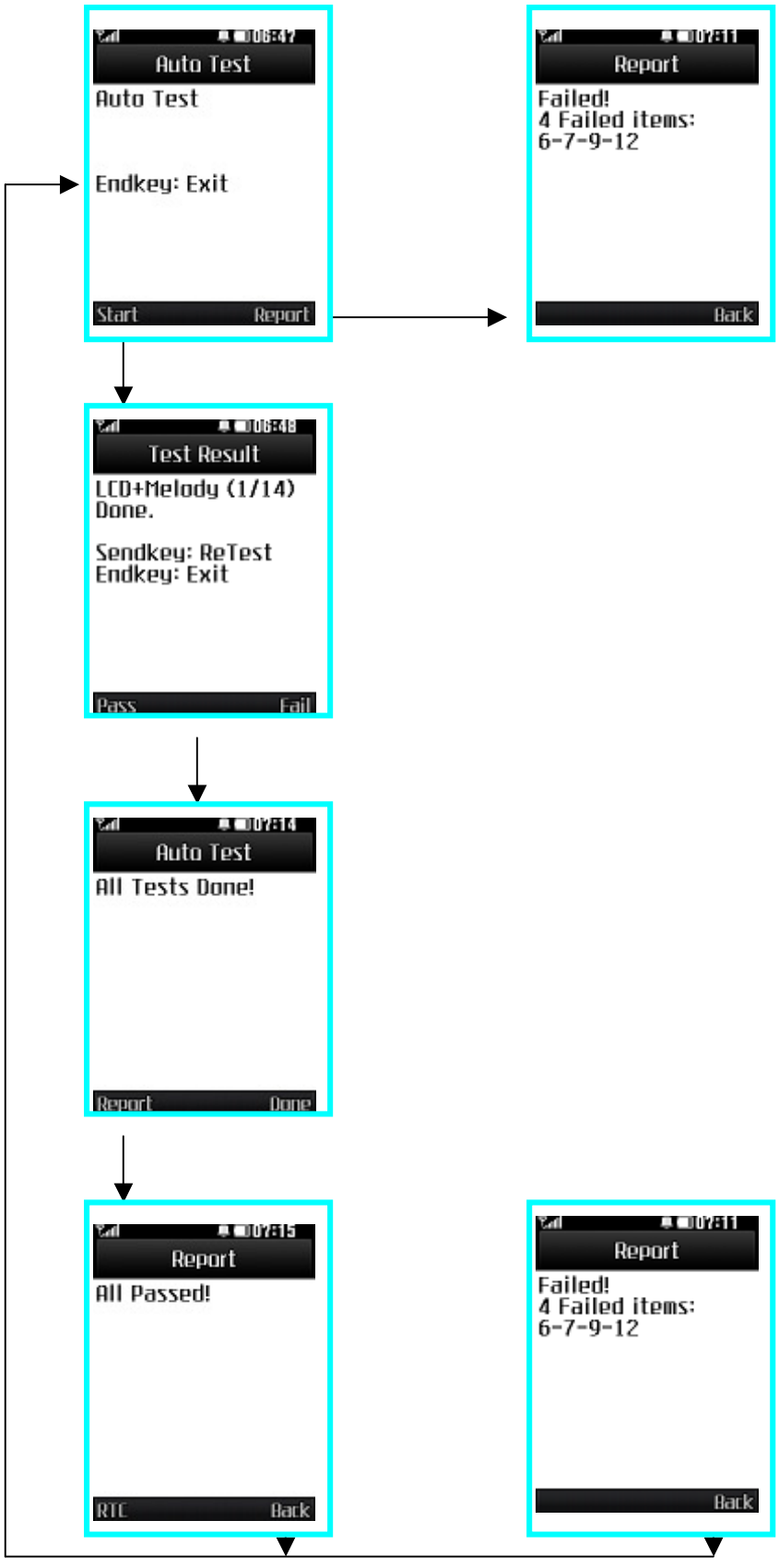
Auto Test Mode

This auto test mode is designed to do the baseband test automatically. When you finish all tests, phone will report the result for you.

Enter and Exit Auto Test Mode

In the idle screen, enter “*#878#” and the Auto Test Mode menu will show up. In Auto Test Mode main menu, press Left-Soft-Key (LSK) “Start” will process the test automatically or End key to go back to the idle screen.

Work Flow


Auto Test
Auto Test
Endkey: Exit
Start
Report
Report
Failed!
4 Failed items:
6-7-9-12
Back
Test Result
LCD+Melody (1/14)
Done.
Sendkey: ReTest
Endkey: Exit
Pass
Fail
Auto Test
All Tests Done!
Report
Done
Report
All Passed!
RTC
Back
Report
Failed!
4 Failed items:
6-7-9-12
Back

All Auto Test

LCD+Melody, BackLight+Vib+Flashlight, MIC, KeyPad, RTC, Headset, FM-Radio, AM-Radio, Bluetooth, ADC, NAND, MemoryCard, CAMERA, Antenna

1. Charger Test

Check the charger fucntoin is correct or not and charging current.

2 .LCD+Melody

LCD Backlight, LCD pattern and MIDI melody playing.

3 .Backlight+Vibrator

The LCD backlight and keypad backlight with Vibrator on/off on every 0.5sec.

4 .MIC

Enable microphone audio path to pass input sounds to receiver for checking the microphone and receiver component.

5 .KeyPad

Test all keypad keys. All the keys are displayed on the screen. When a key is pressed, the depression is detected and the key disappears from the screen. Once all keys are detected, the test stops and exits.

6. Headset

To test the analog loop back path from headset MIC to headset Receiver.

7 .FM-Radio

Force FM-Radio to receive FM signal and show the RSSI in 100.7 MHz channel.

8 .RTC/ADC test

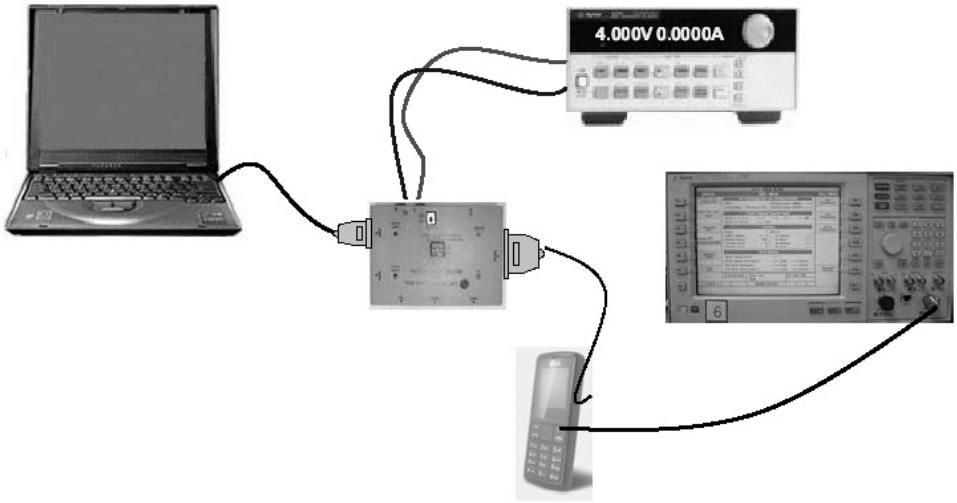
Test RTC and adc, show report in the same screen.

9.Antenna

To test the antenna module.

11.CALIBRATION

11.1 Test Equipment set up



11.2 Calibration Steps

Environment Requirement:

OS:

MS Windows 2000 or XP

Hardware:

Generic Pentium III or above PC (256M RAM or above)

GPIB Card

- National Instruments GPIB device and driver
- Agilent GPIB card and driver
- KEITHLEY GPIB card and driver

Radio Communication Tester

- Rohde & Schwarz CMU 200
- Agilent 8960
- Anritsu MT8820
- Rohde & Schwarz CMD55
- Willtek WT4400
- Agilent N4010A (for Bluetooth test)
- Rohde & Schwarz CBT (for Bluetooth test)
- Anritsu MT88852 (for Bluetooth test)

DC Power Supply

- Agilent 661x or Agilent 663x2 series power supply
- R&S NGSM Power Supply
- KEITHLEY 2303, 2304, 2306
- Agilent 3631A power supply
- Willtek WT4400 power supply option

Others

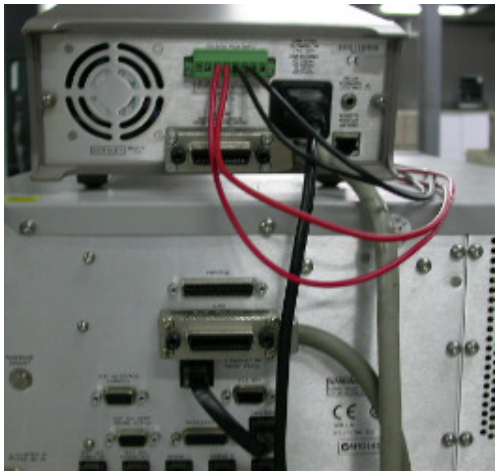
USB download cable

Dummy battery

RF cable

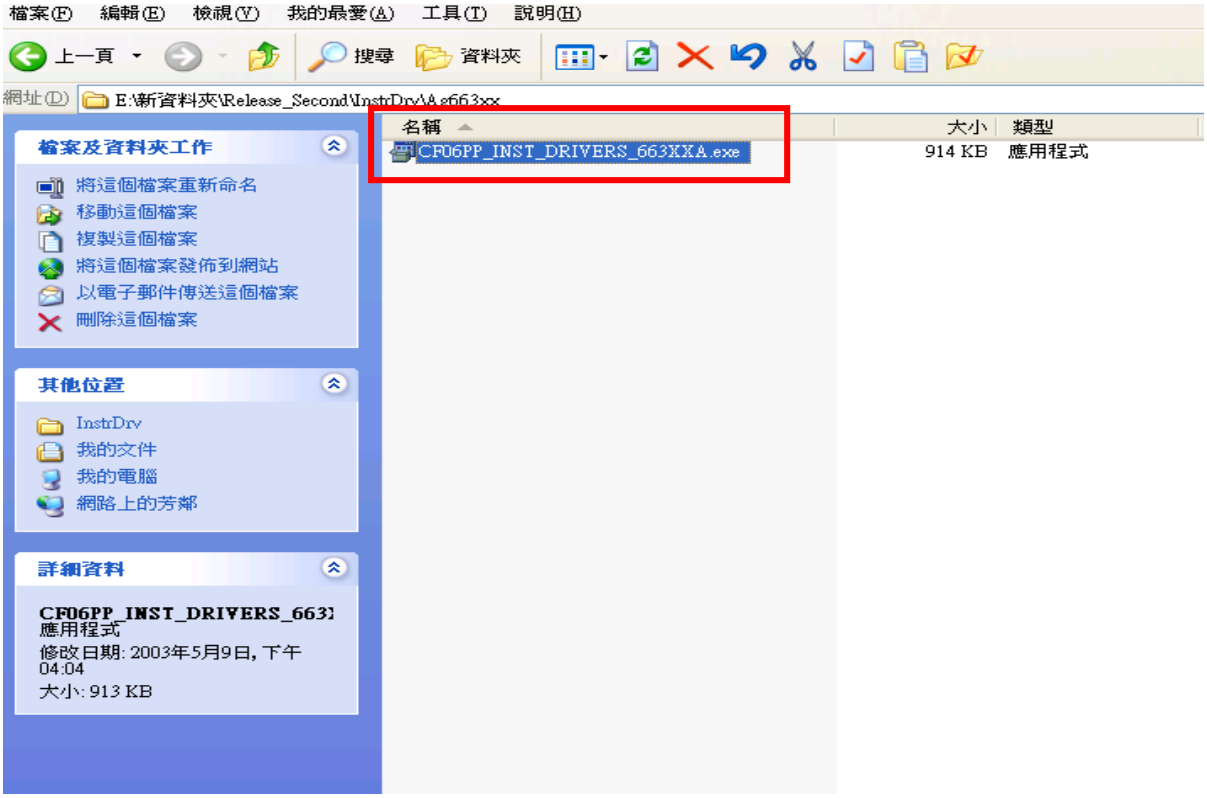
The following diagrams depict the system setups when using the Agilent test platform.

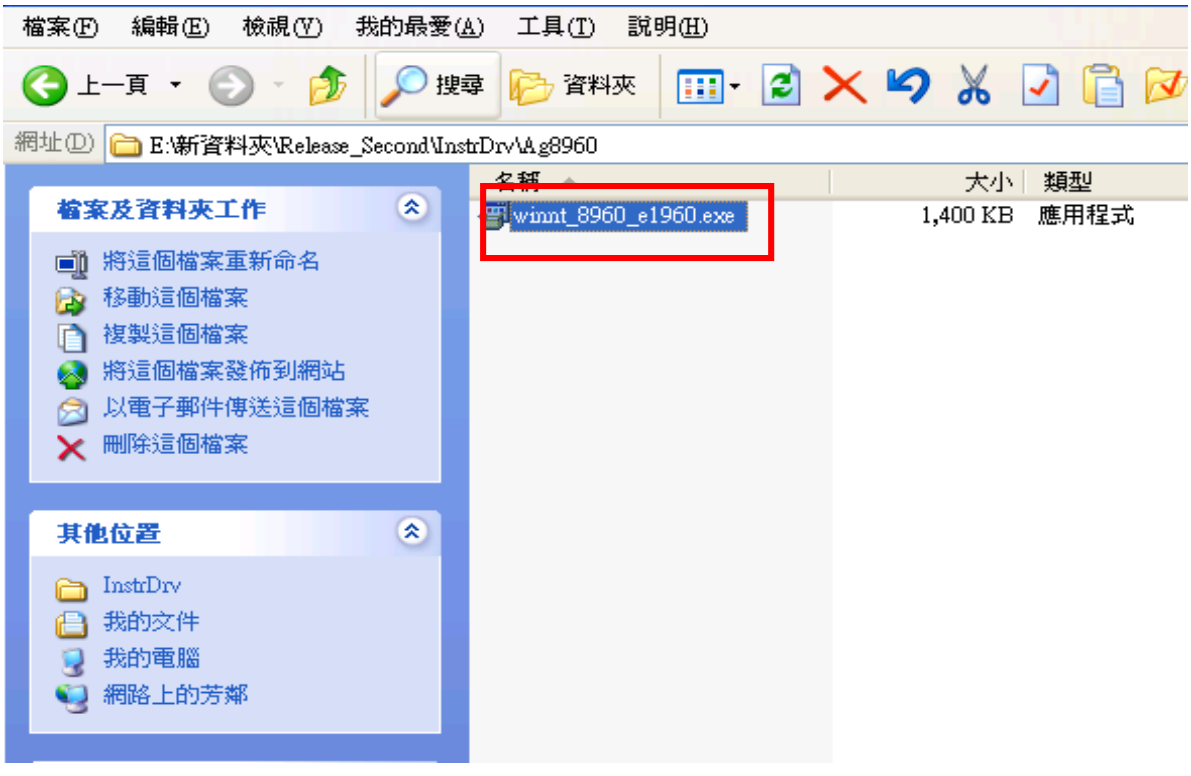
Connect 8960, power supply , computer ,phone

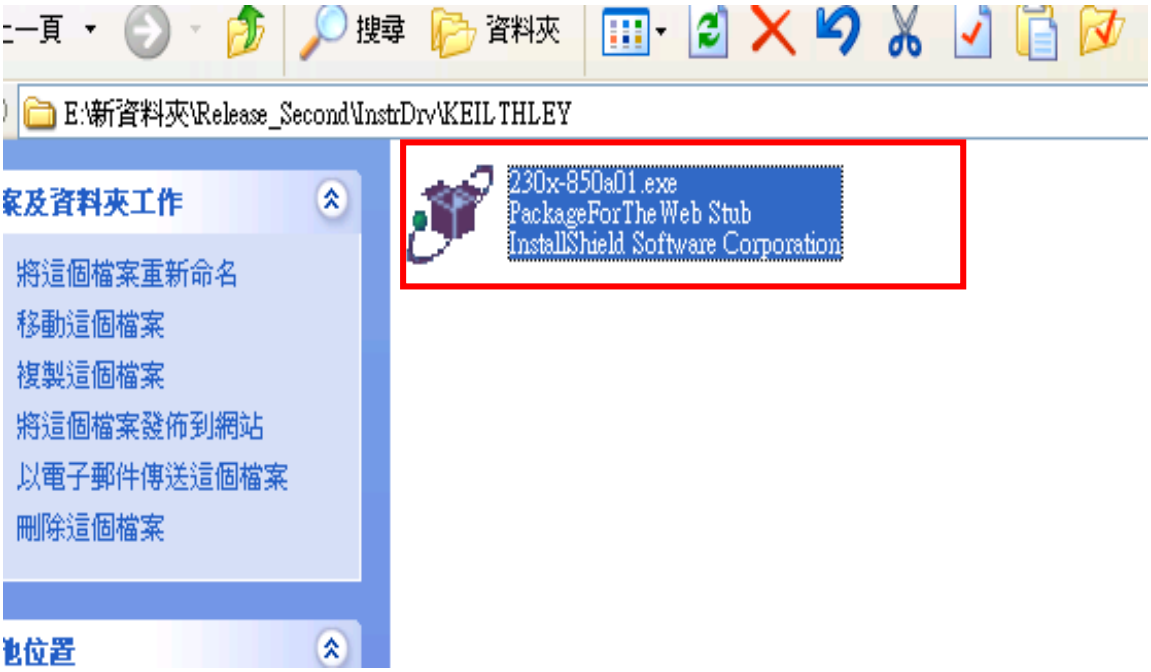


When install the MTK ATE tool, first install driver.

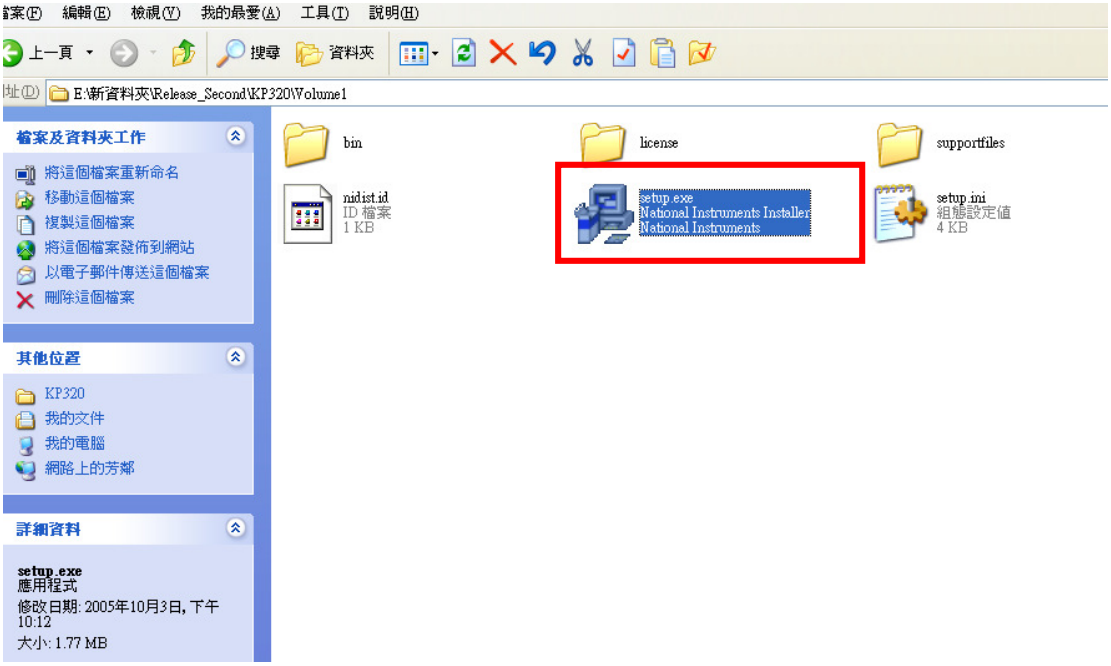
In turn execute CF06PP_INST_DRIVERS_663XXA.exe, winnt_8960_e1960.exe, 230x-850a01.exe.



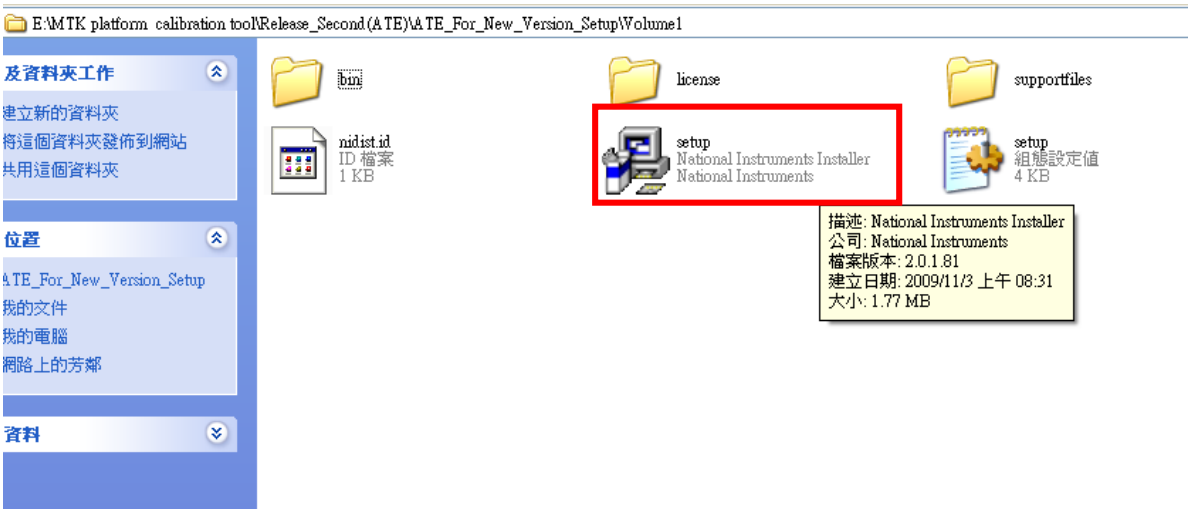



一頁
搜尋
資料夾
E:\新資料夾\Release_Second\InstrDrv\KEILTHLEY
案及資料夾工作
將這個檔案重新命名
移動這個檔案
複製這個檔案
將這個檔案發佈到網站
以電子郵件傳送這個檔案
刪除這個檔案
位置
230x-850a01.exe
PackageForTheWeb Stub
InstallShield Software Corporation

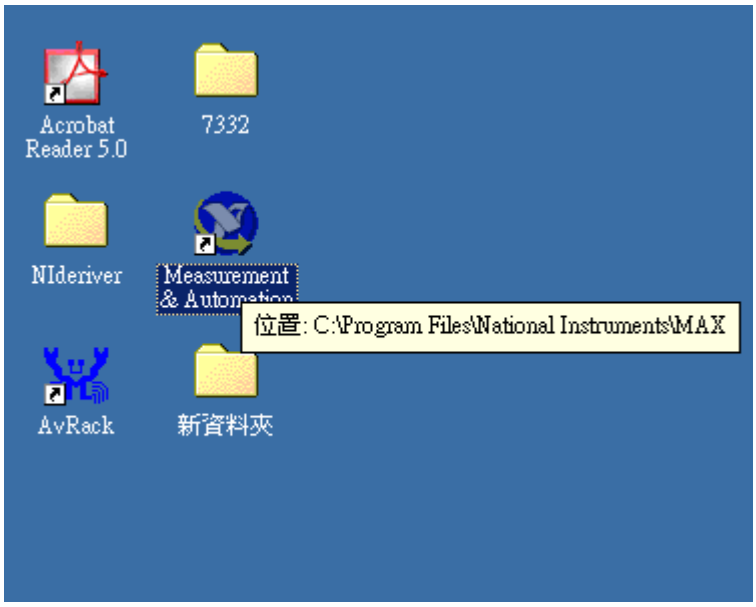
Second， to install the MTK ATE tool, execute the KG195 \ Volume1 \setup.exe file. The Installation Wizard guides the user through the installation process step by step, up to Installation finish.



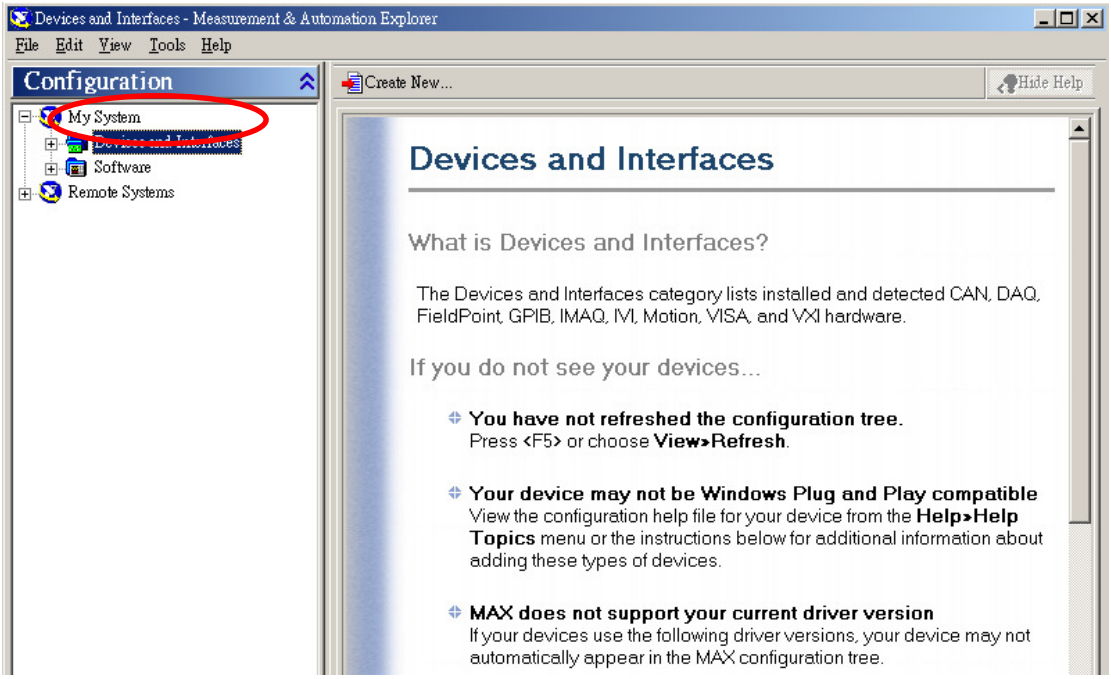
Third， to install the MTK ATE tool, execute the ATE_For_New_Version_Setup \ Volume1 \setup.exe file. The Installation Wizard guides the user through the installation process step by step, up to Installation finish.



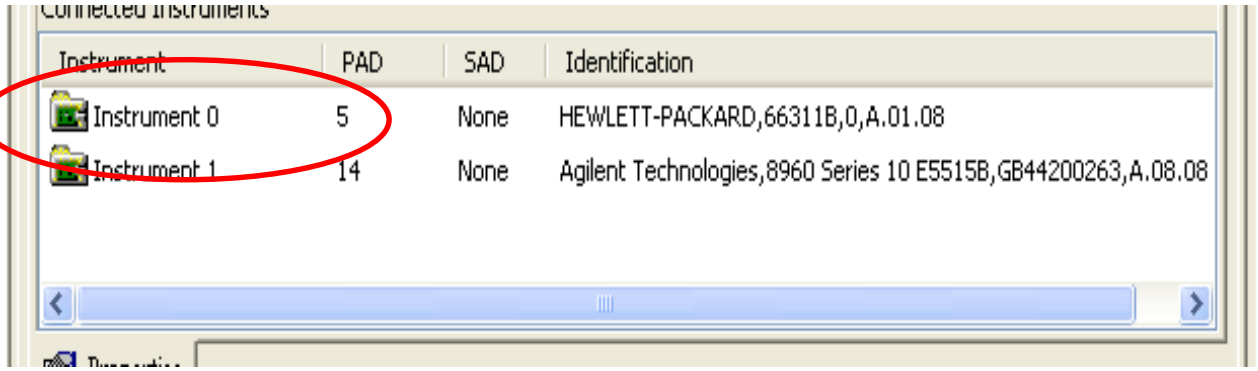
Execute Measurement & Automation to check equipment address



Choose Devices and Interfaces

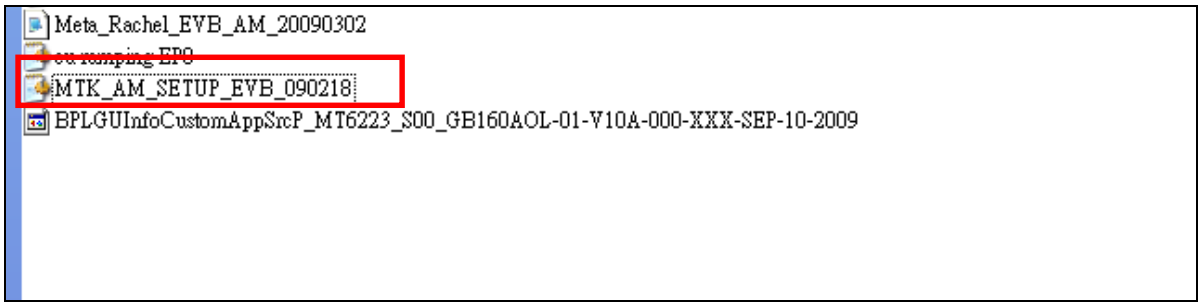


You can see your equipment address

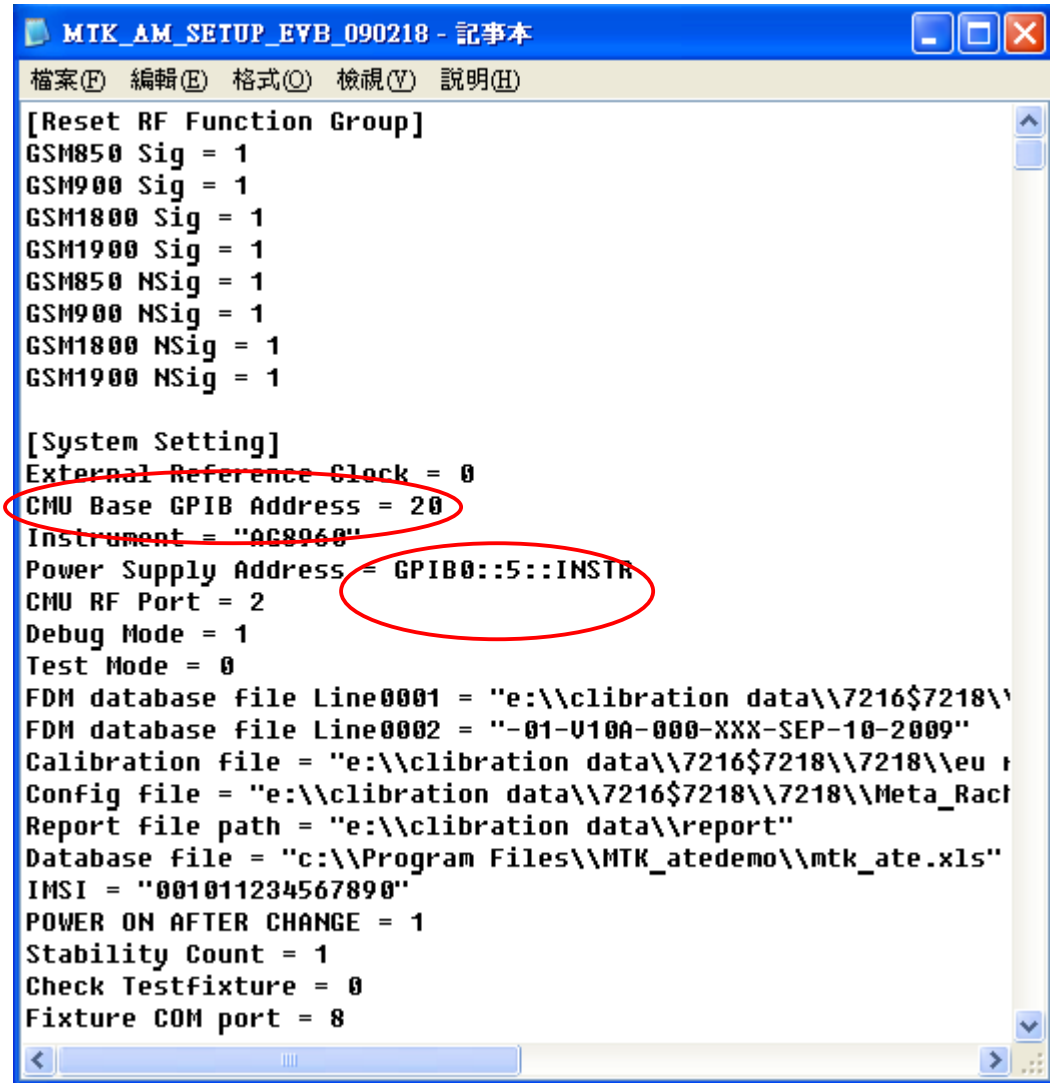


Choose MTK_AM_SETUP_EVB_090218.ini and open the file to setup from data files .

（For example: GB160）



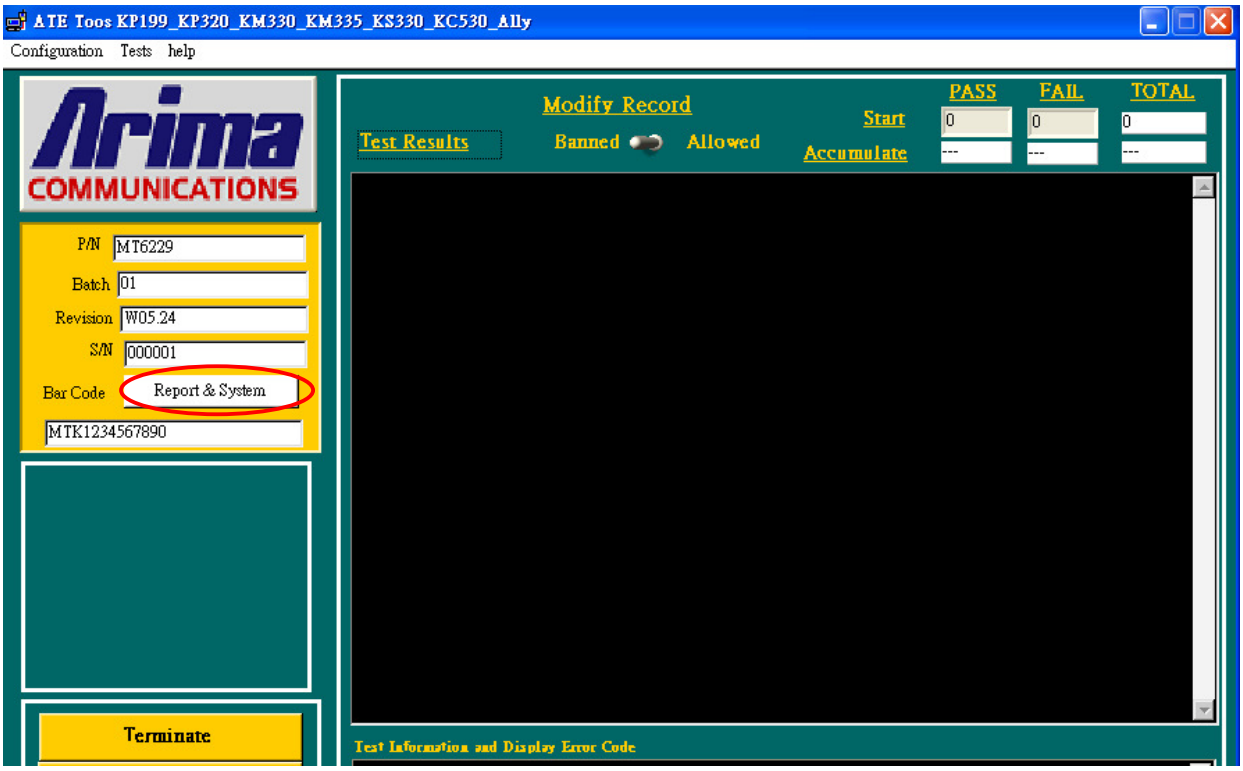
Setup your CMU Base GPIB address and power supply address



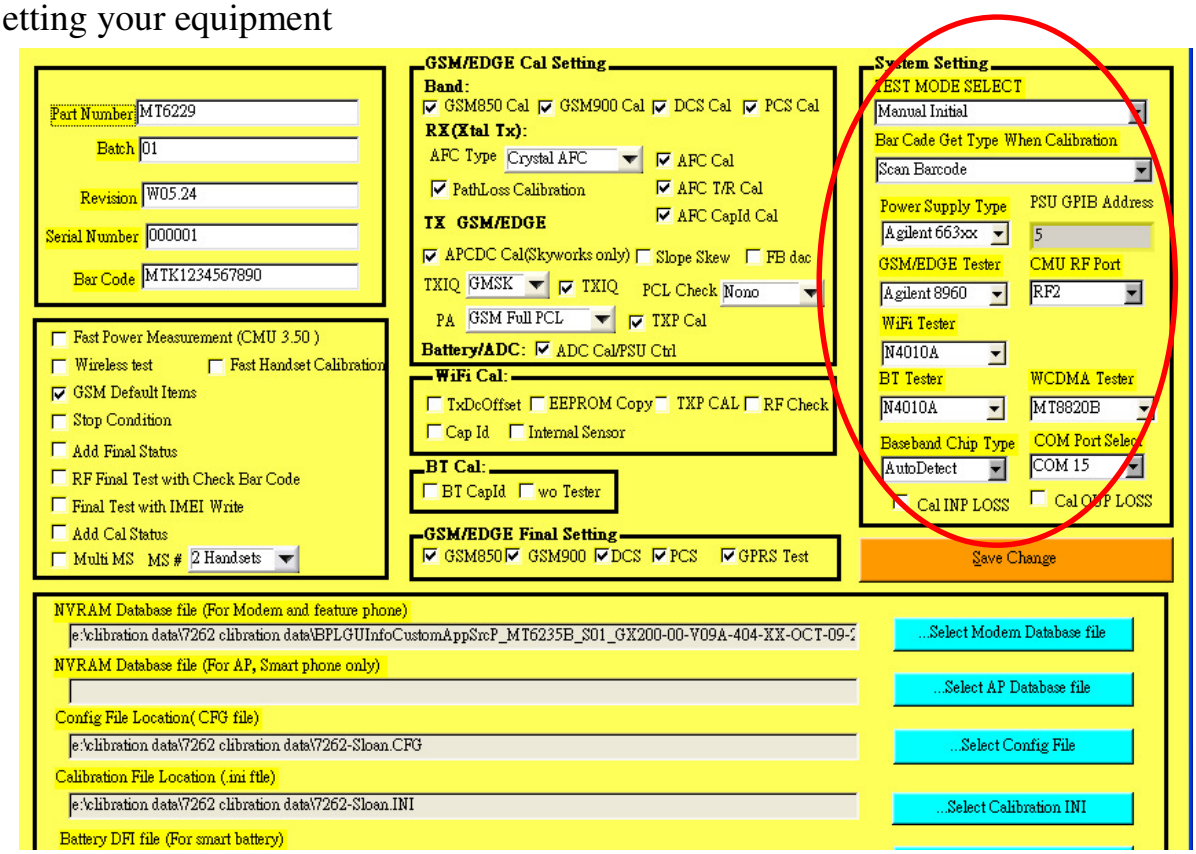
ATE Tool system setting

Execute MTK _ ate demo

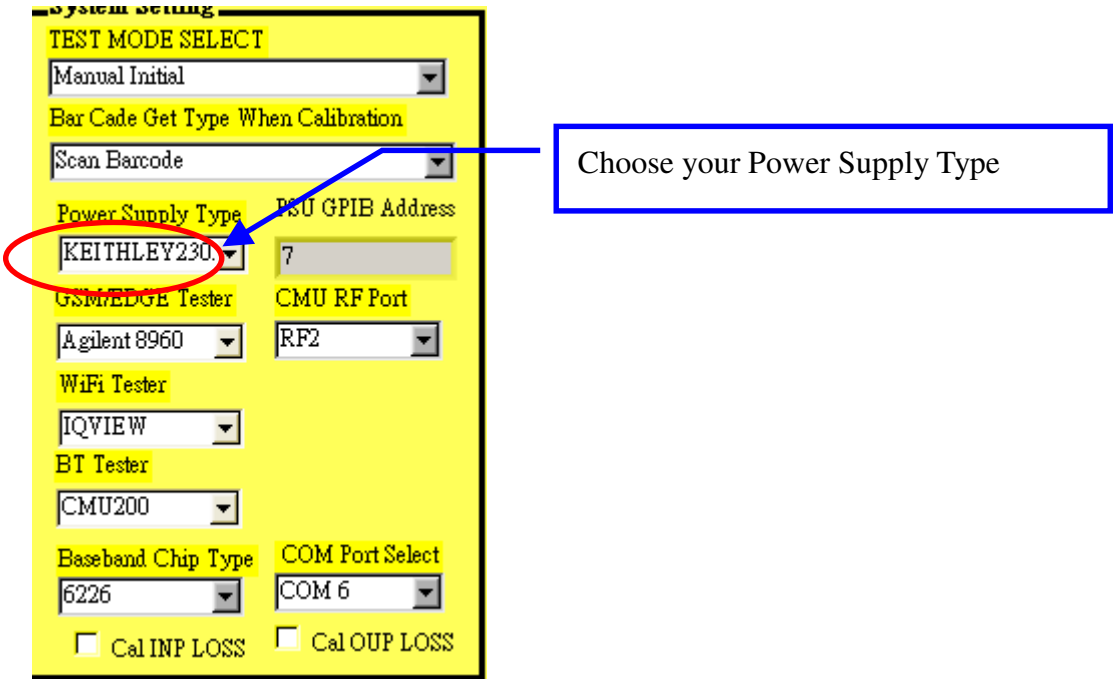
Press Report & System button



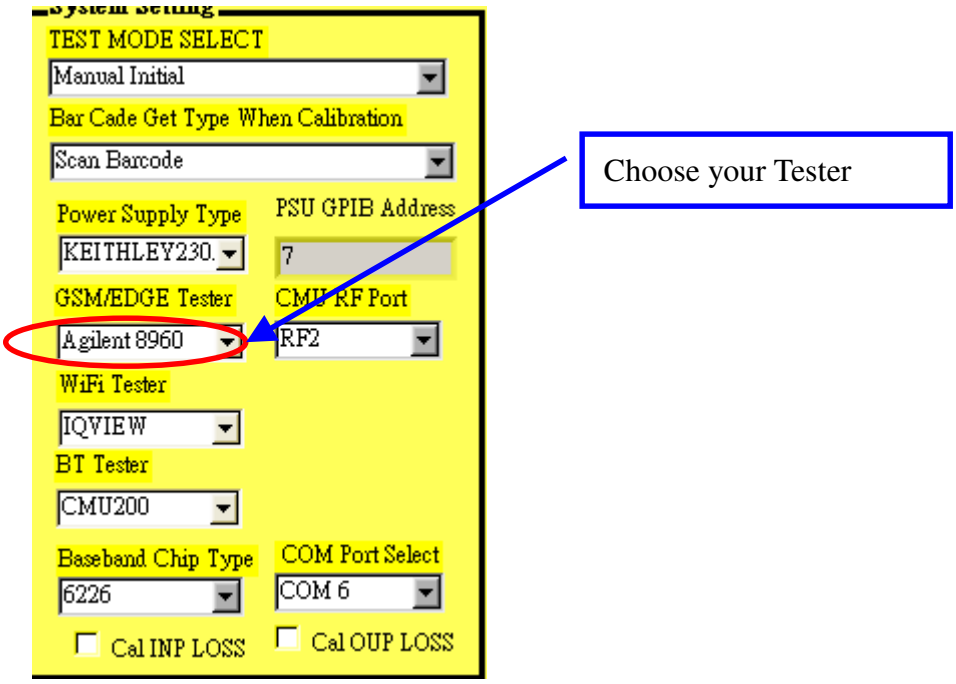
Setting your equipment



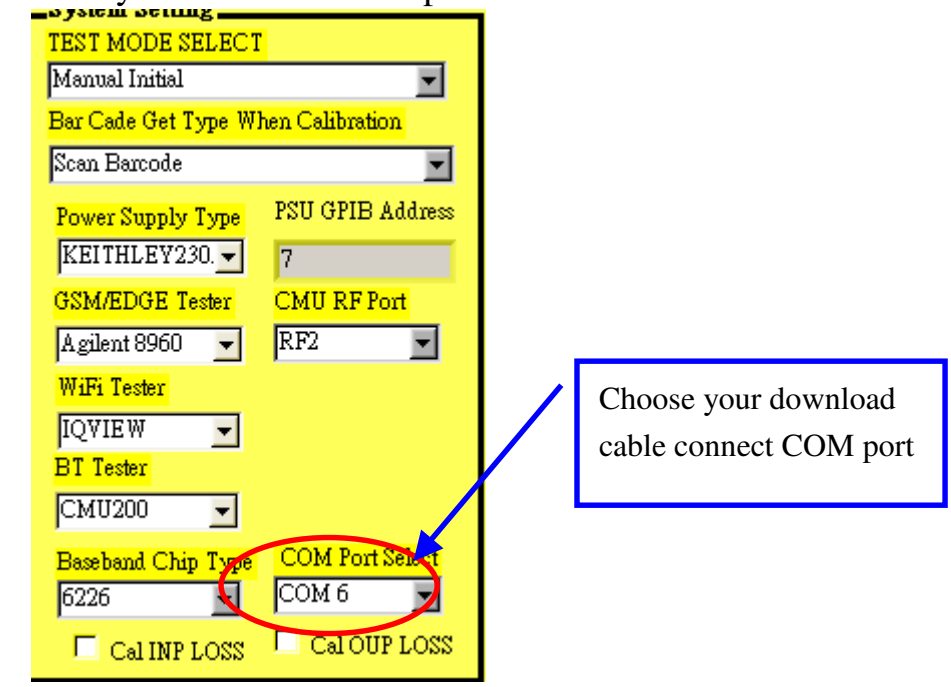
Setting your power supply type



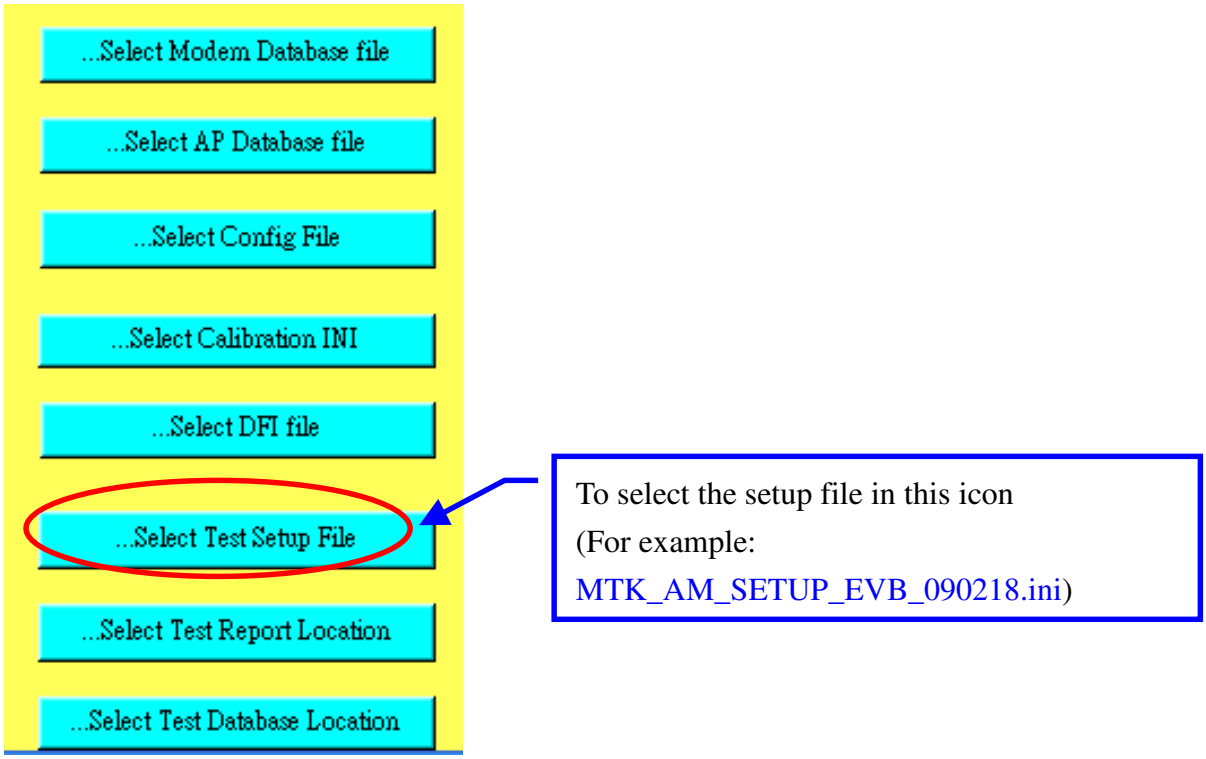
Setting your GSM/EDGE Tester



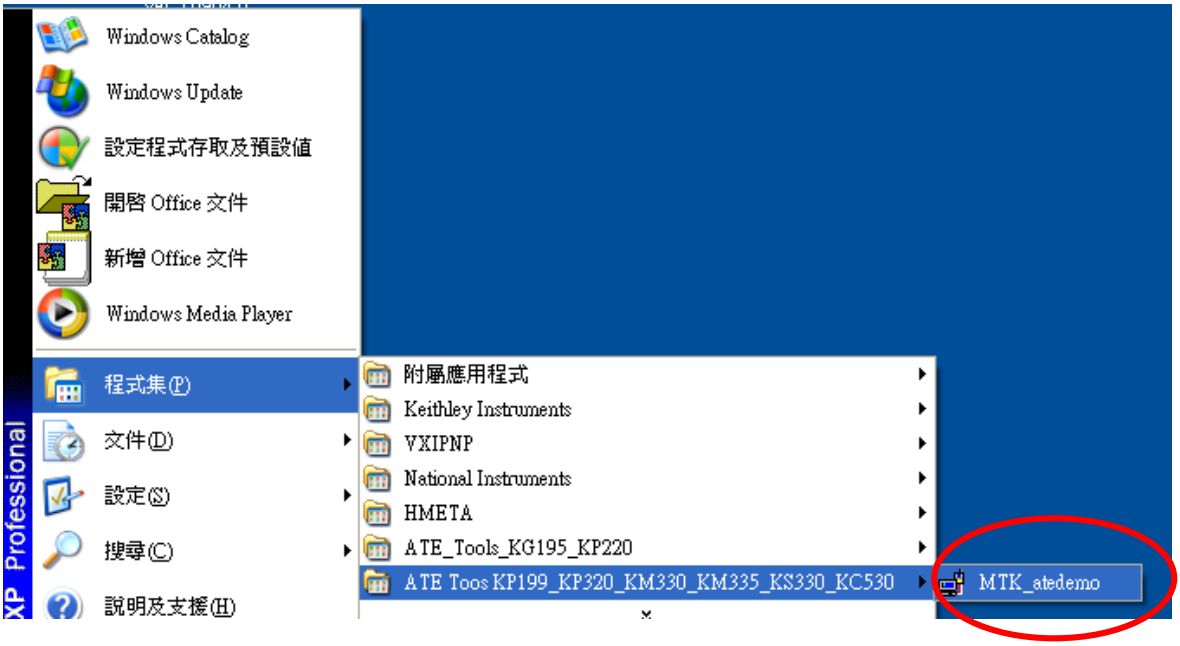
Choose your download com port



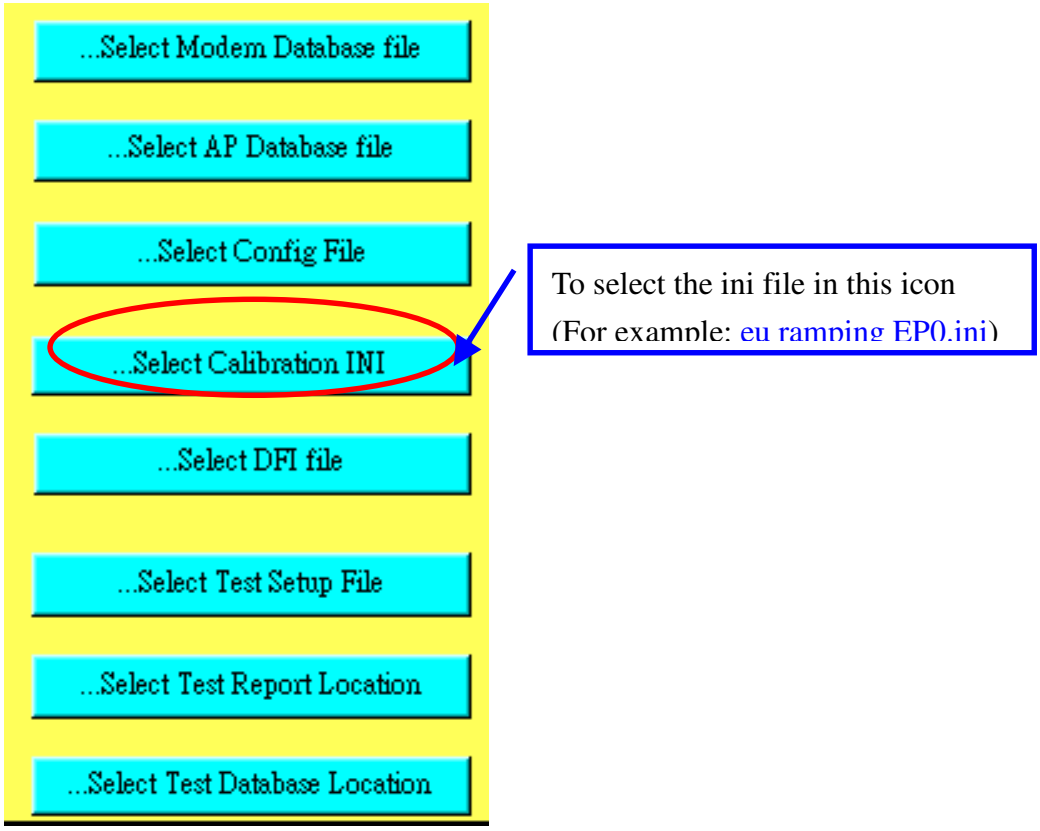
Choose “select test setup file”



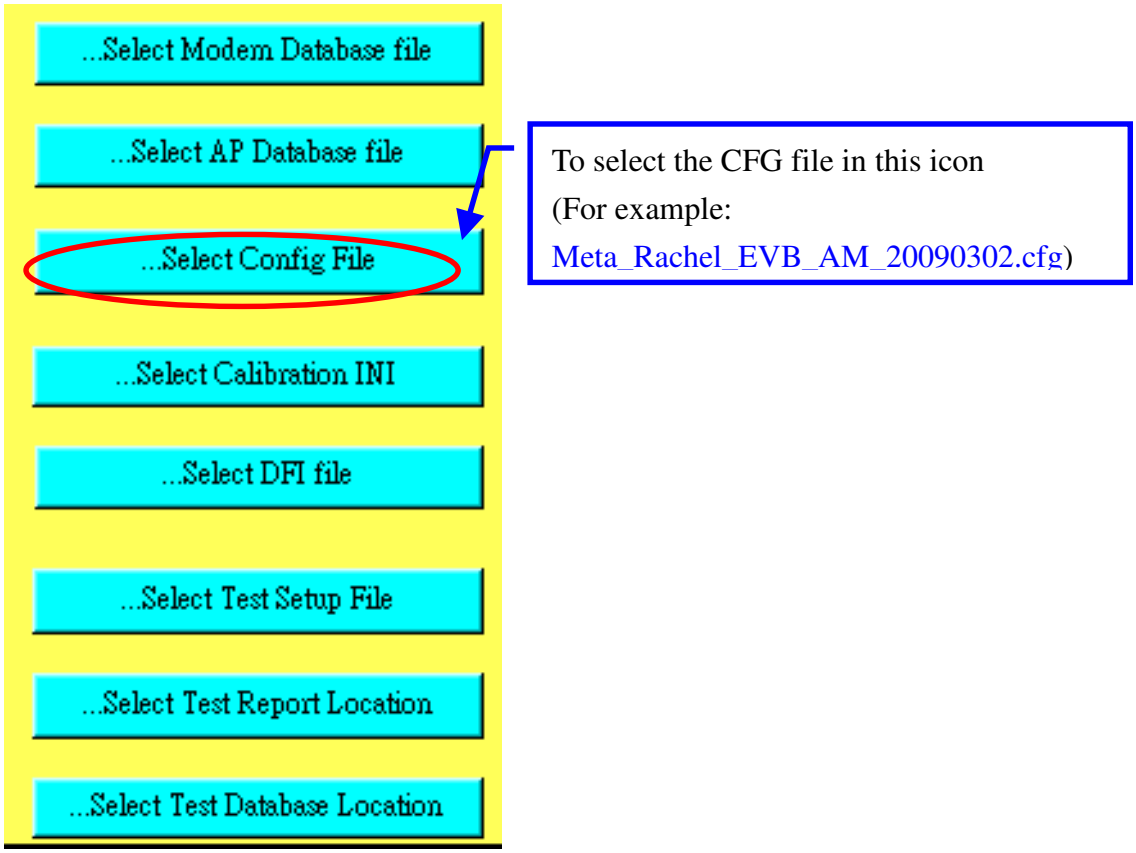
Execute MTK _ ate demo again



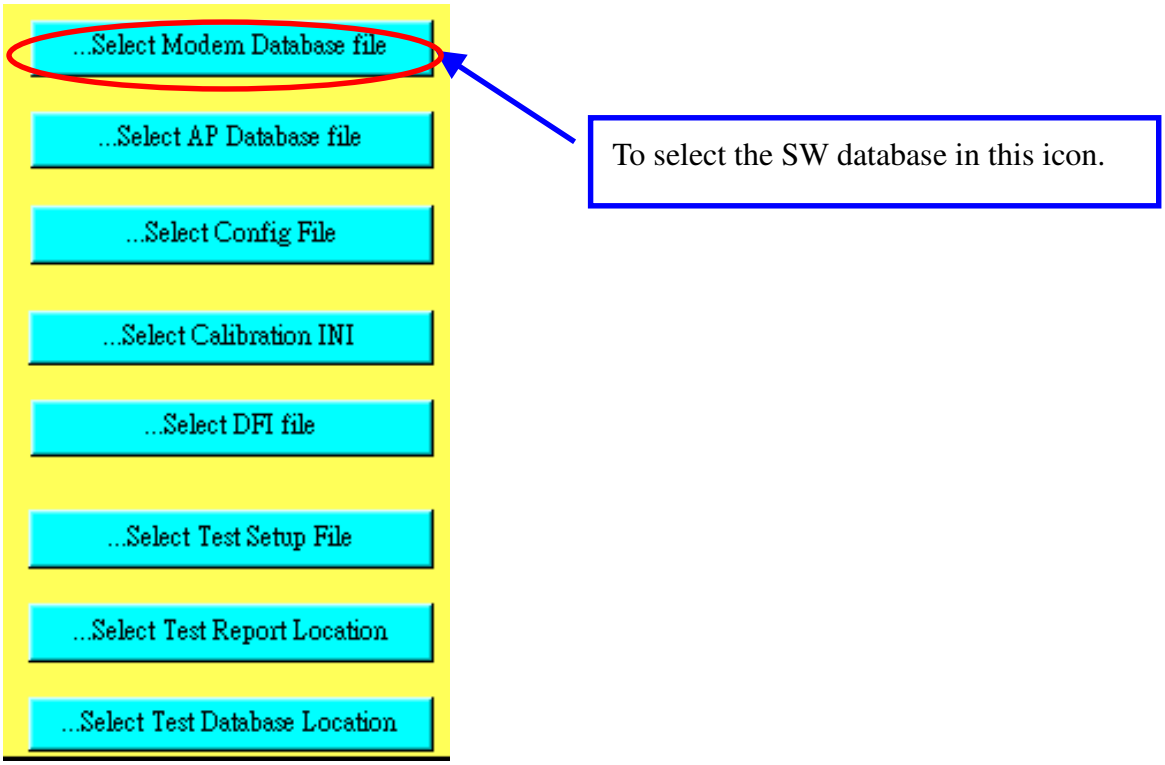
Choose Calibration INI



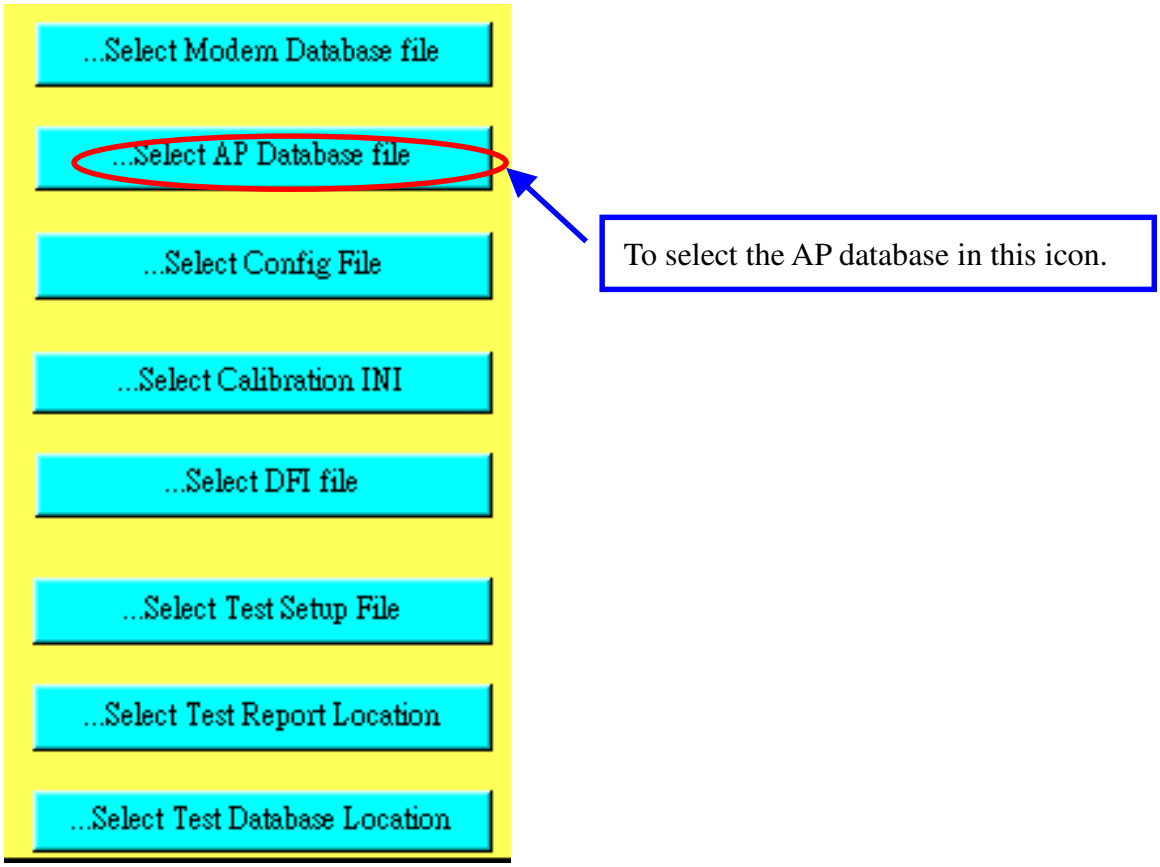
Choose Con fig File



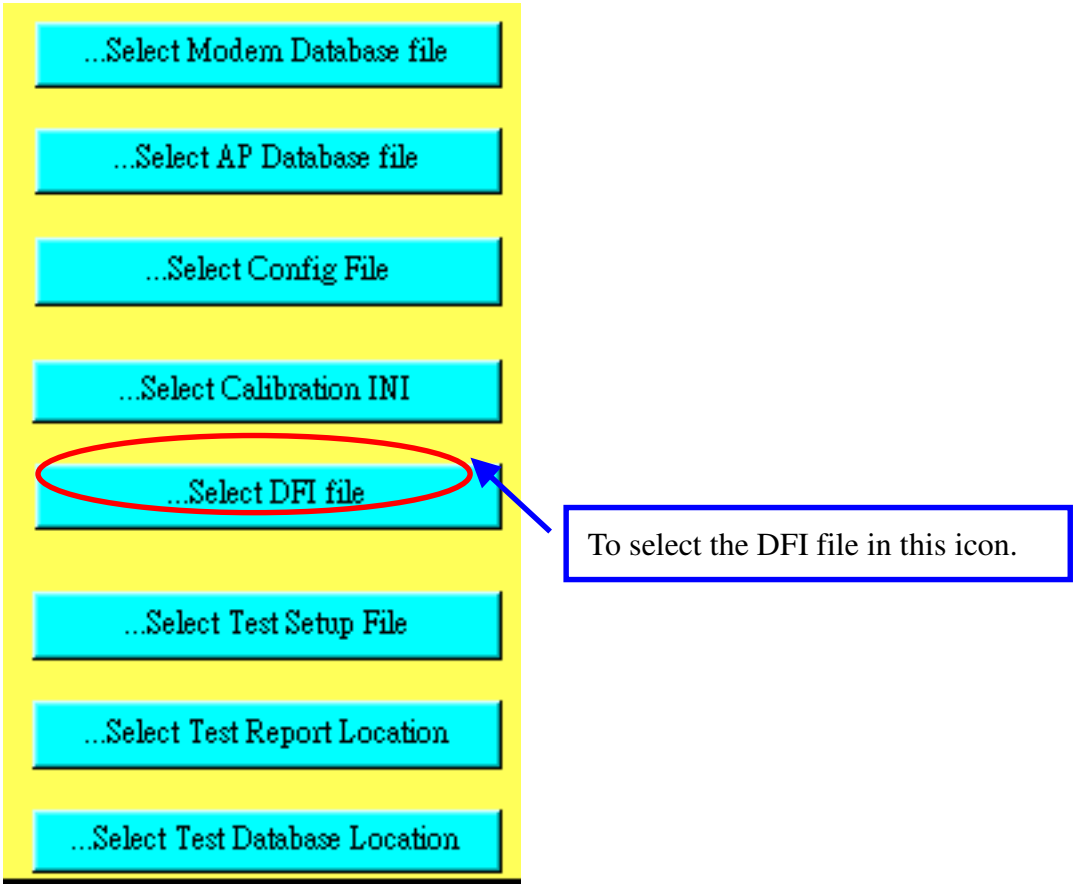
Choose NVRAM Database file



Choose AP database file (Caution: ONLY Smart phone need choose it)

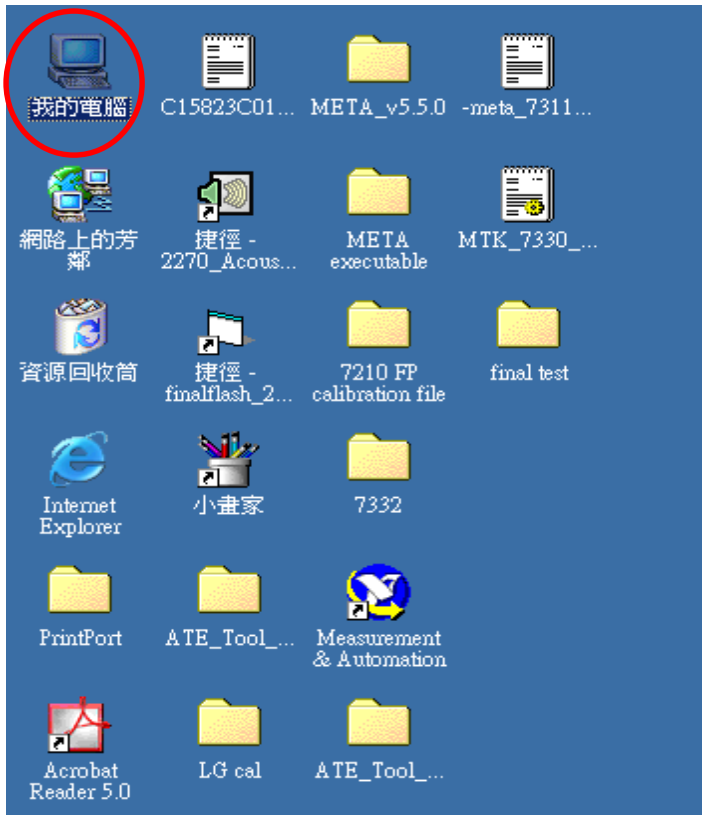


Choose Battery DFI file (Caution: ONLY Smart battery need choose it)



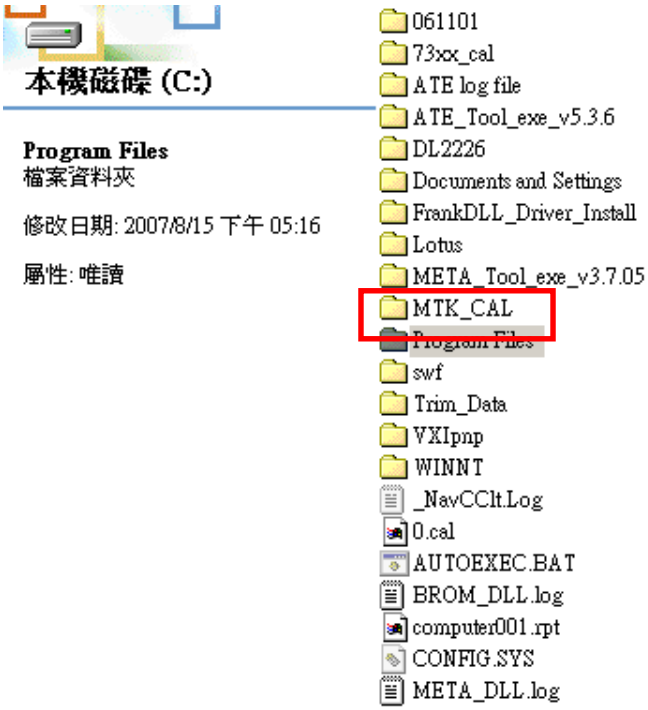
How to setup your test report location

Choose my computer

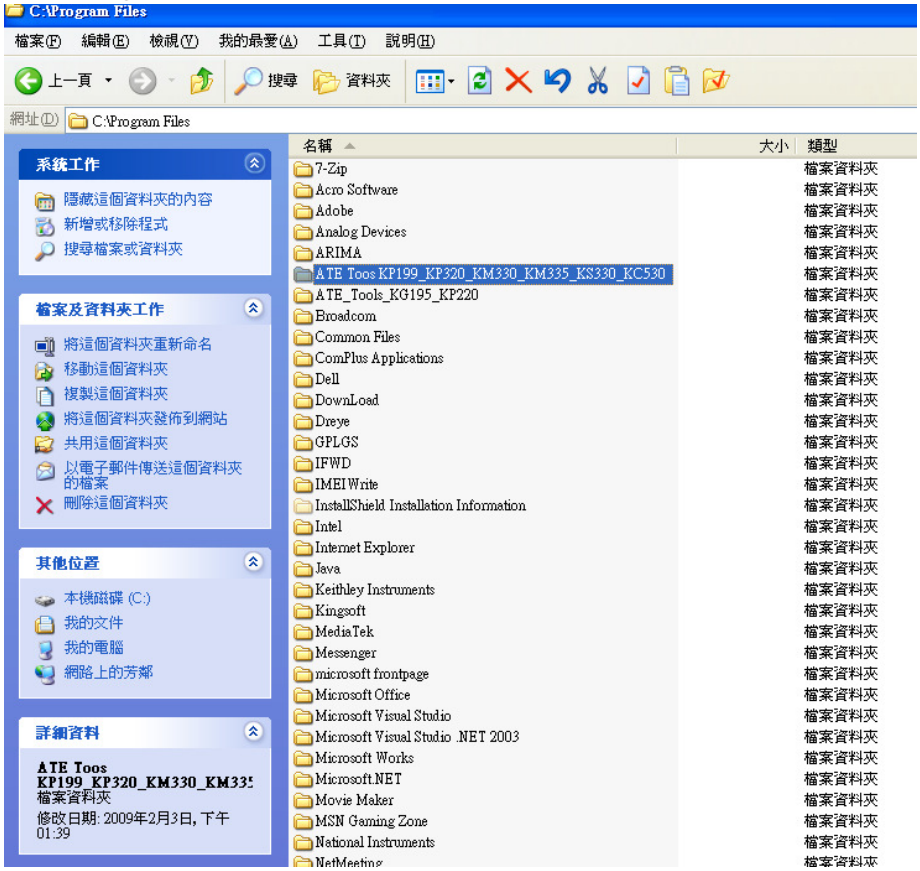


Choose “C” disk

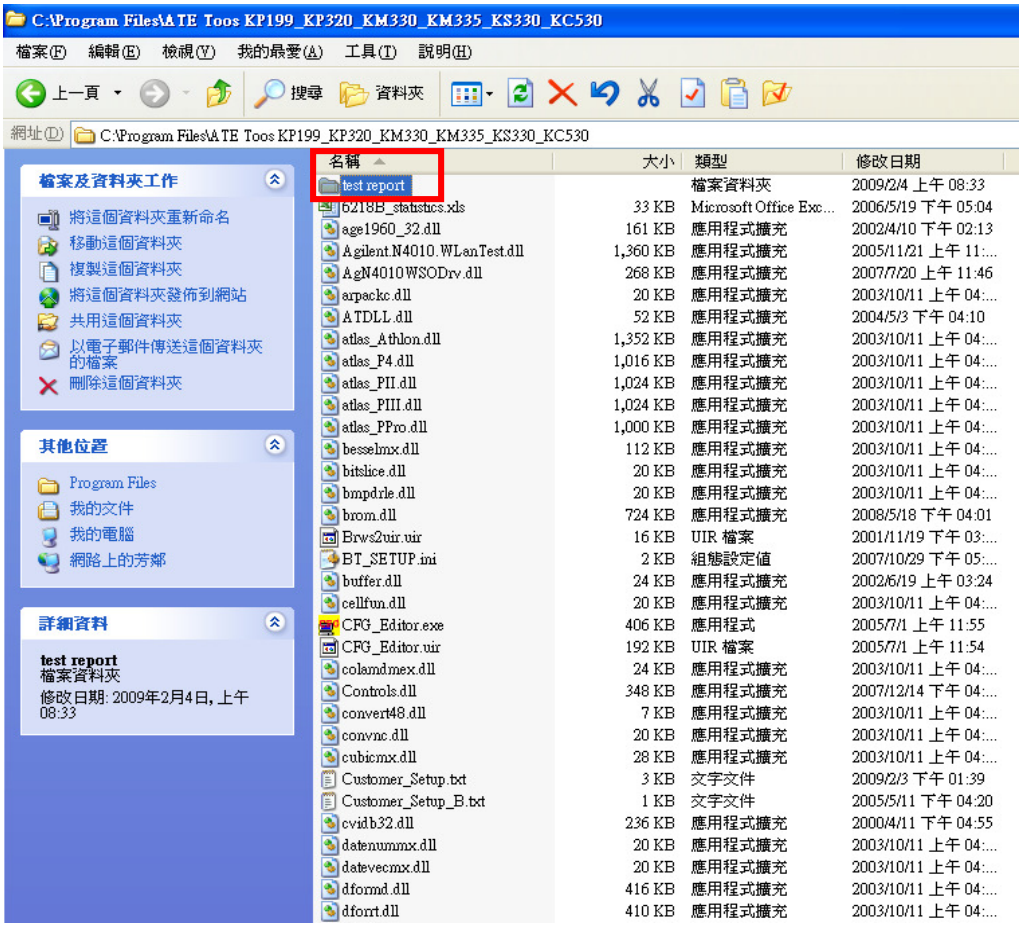
Choose “program files”



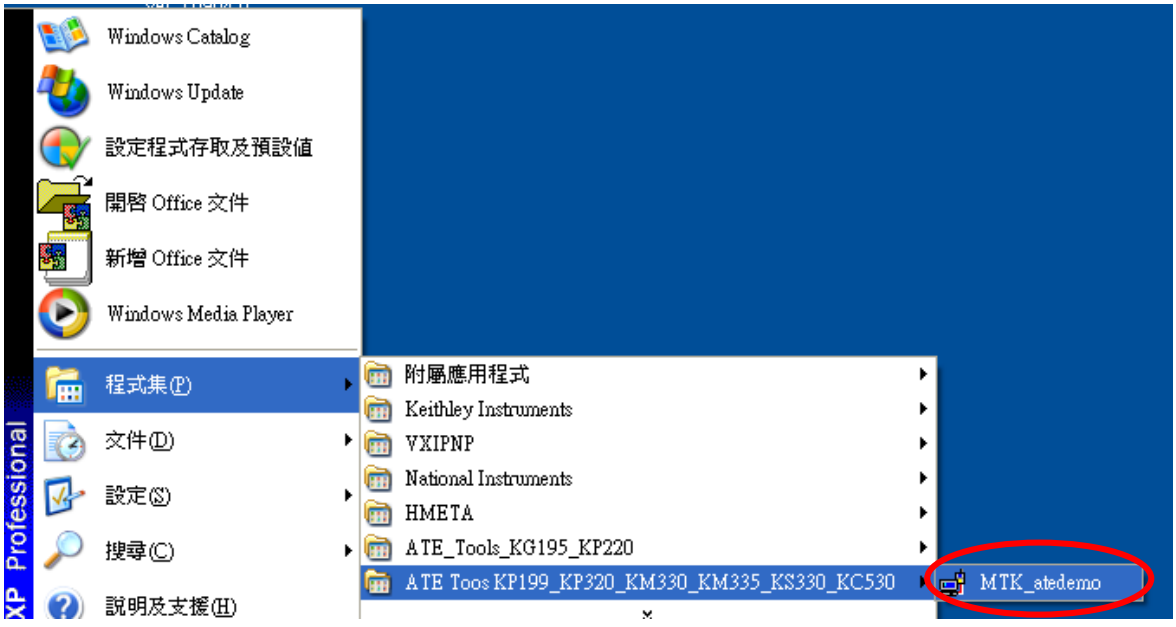
Choose “Program Files \ATE Tools KP199_KP320_KM330_KM335_KC530”file



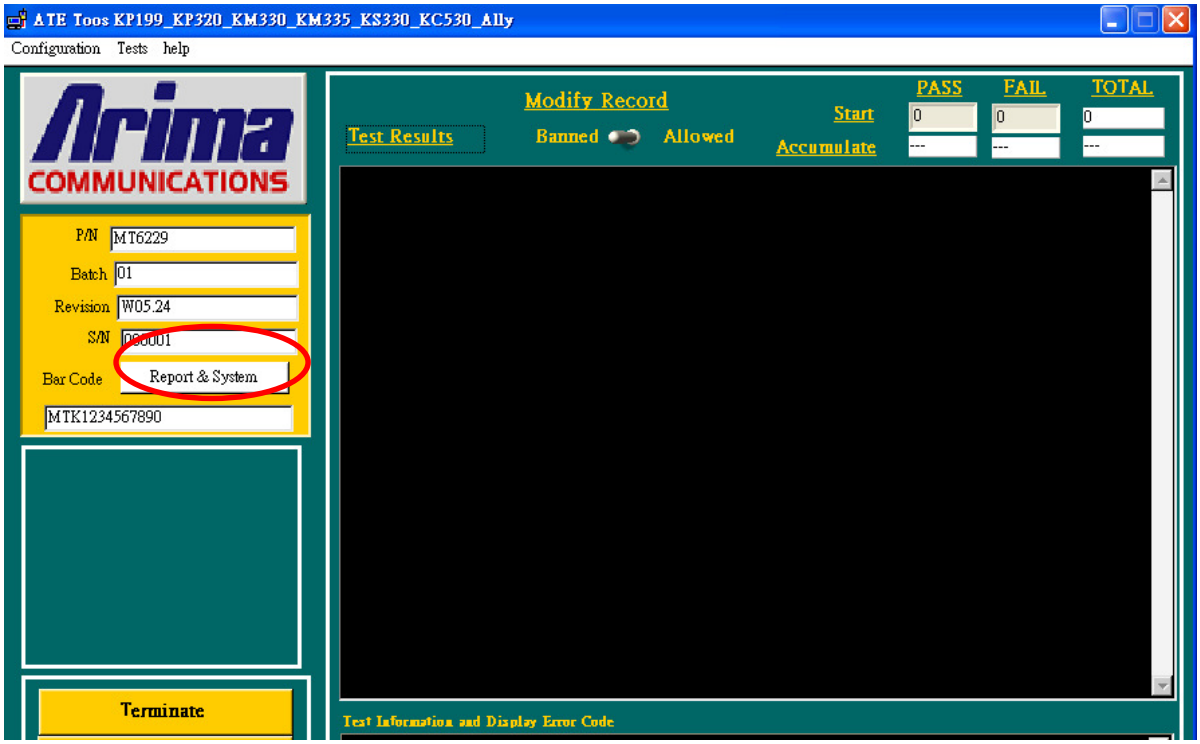
Setup new file and leave the window



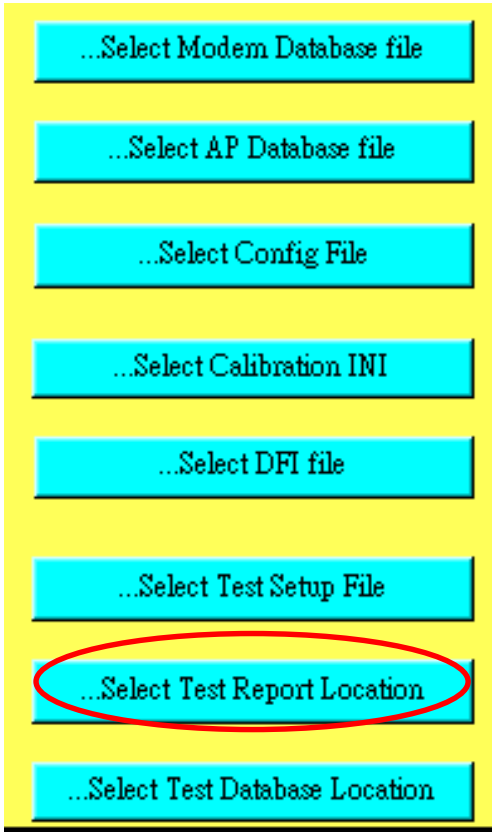
Execute MTK _ ate demo



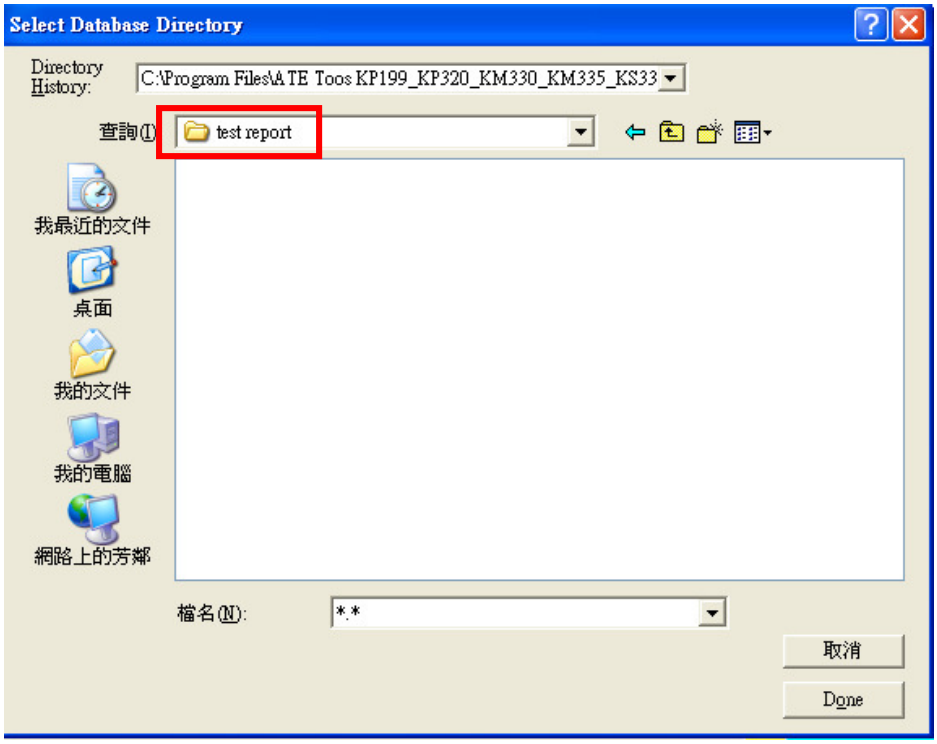
Press Report & System button



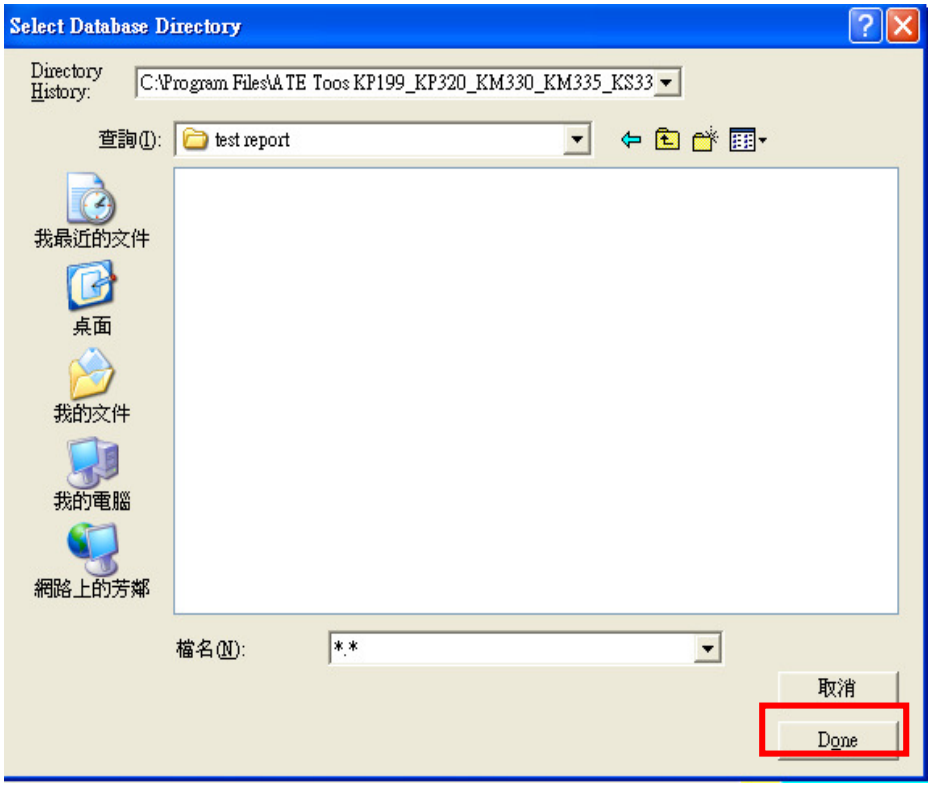
Press “select test report location”



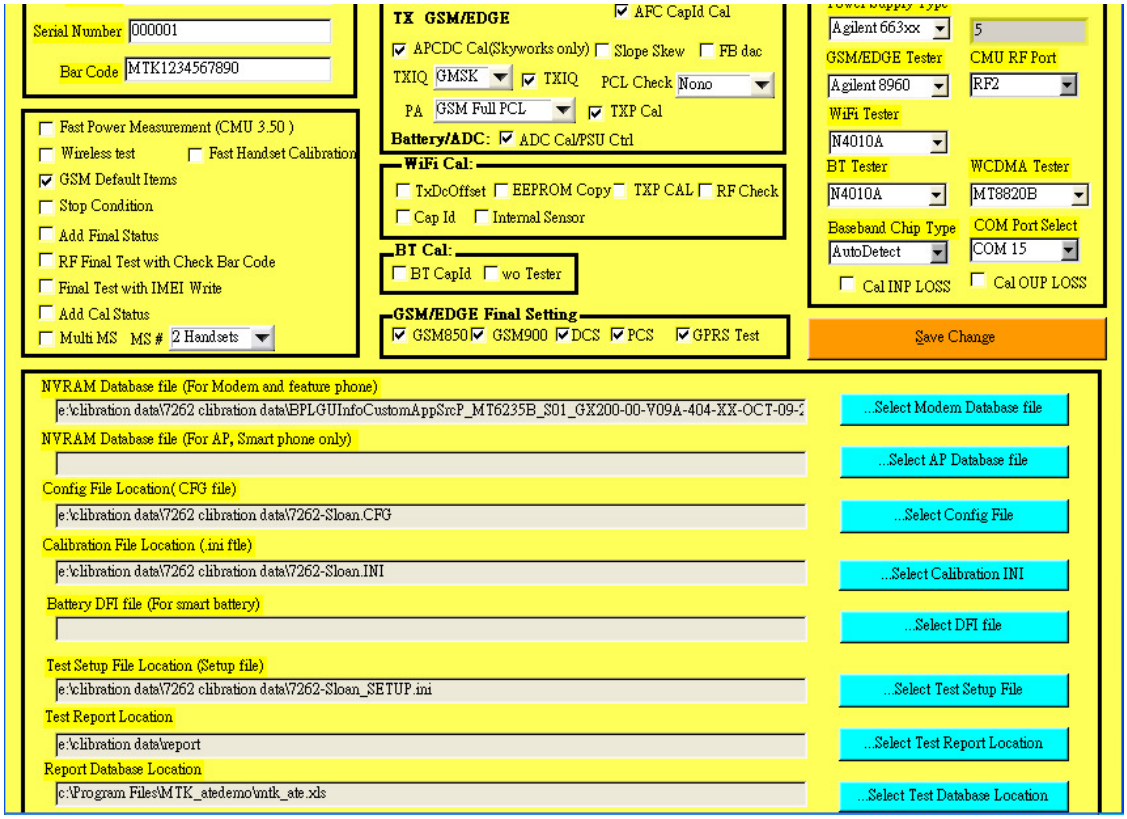
Choose your setup report



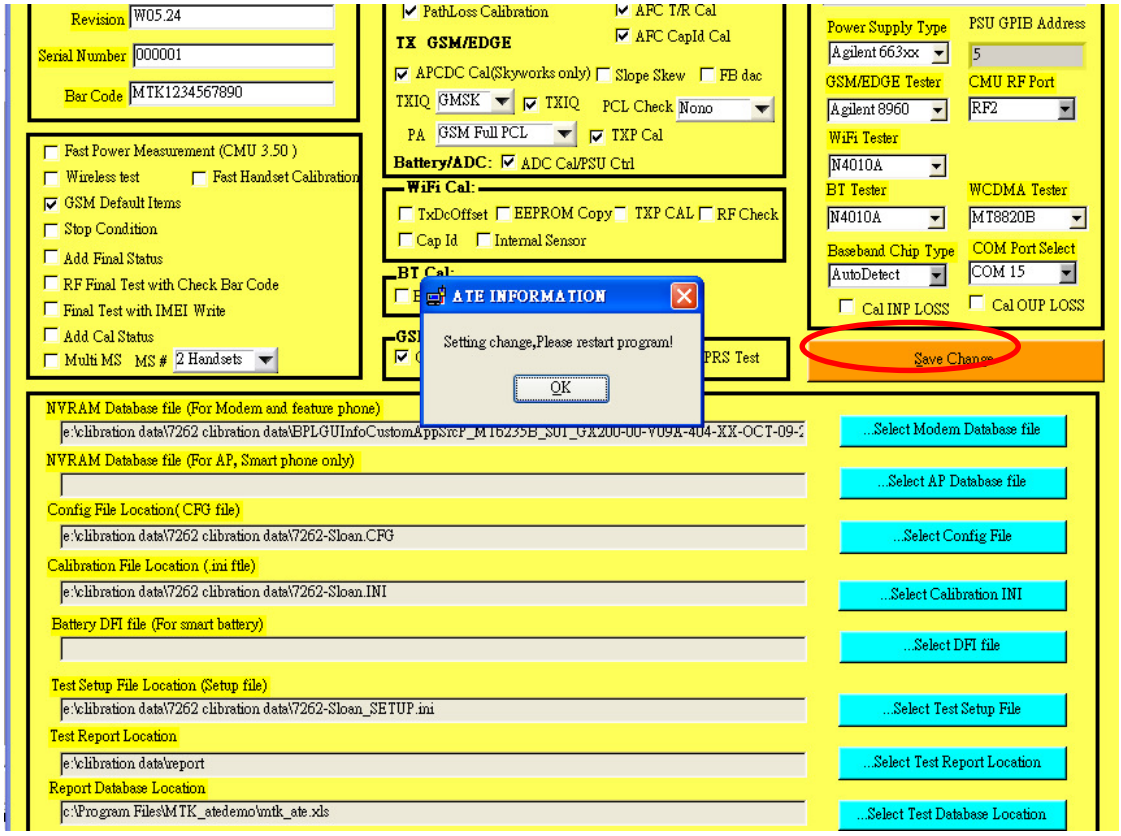
Press “Done”



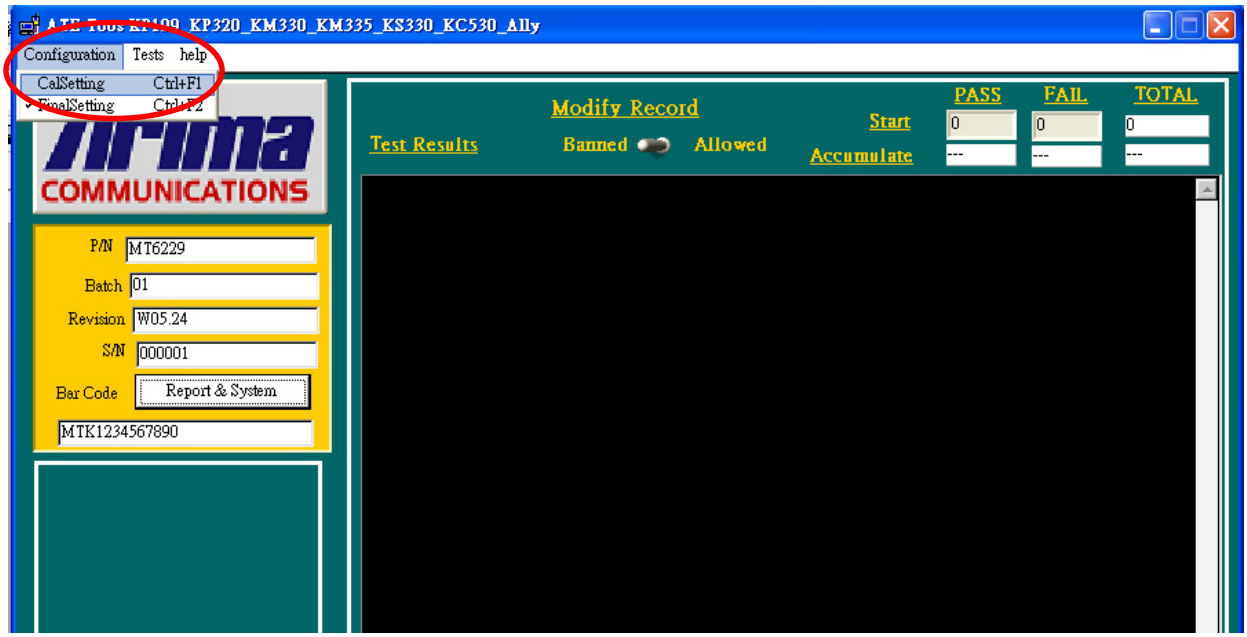
Setup finish



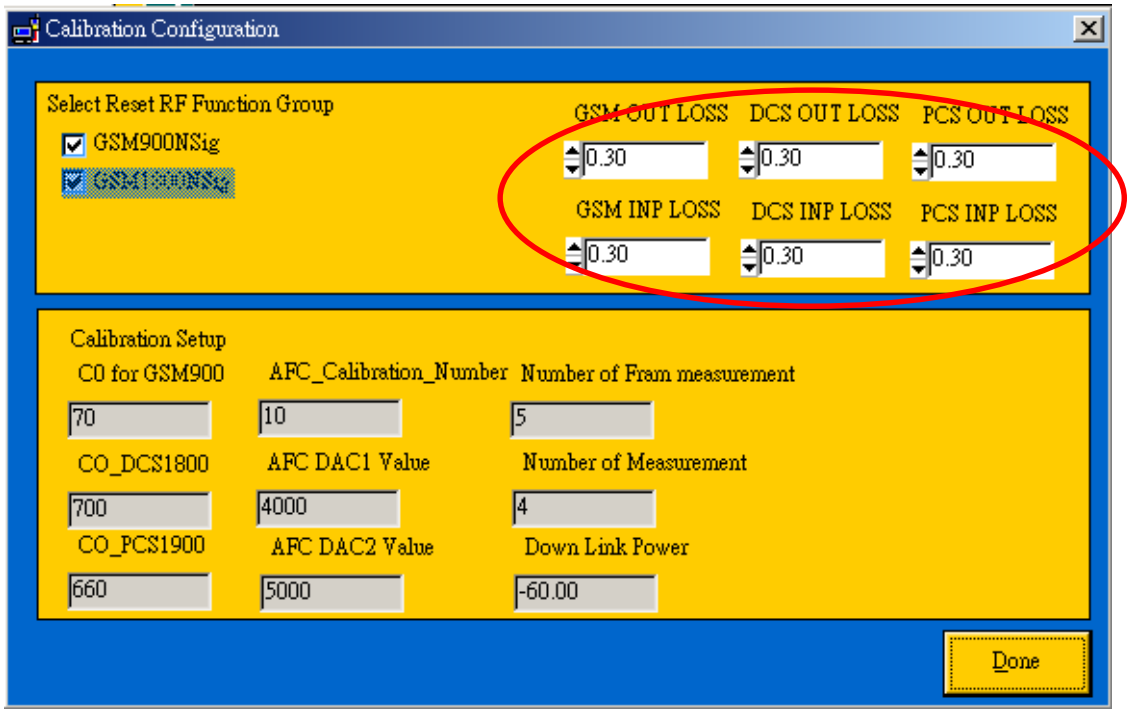
When you finish the setup then you press save change icon.



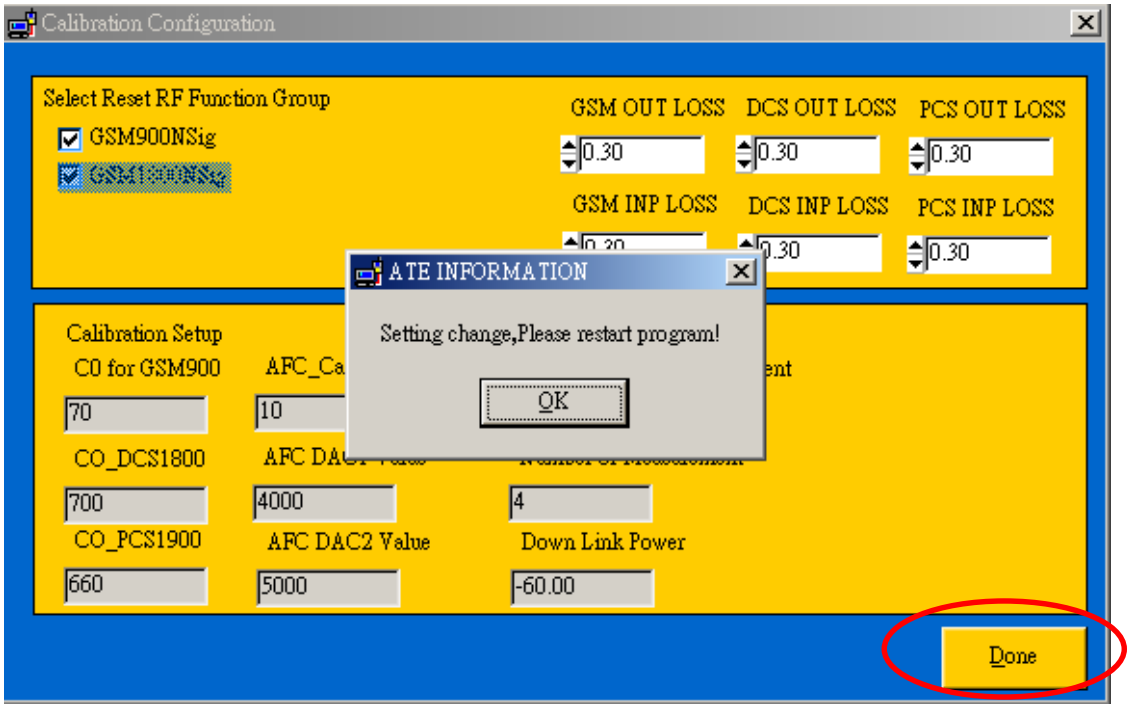
Press Configuration choose Cal Setting



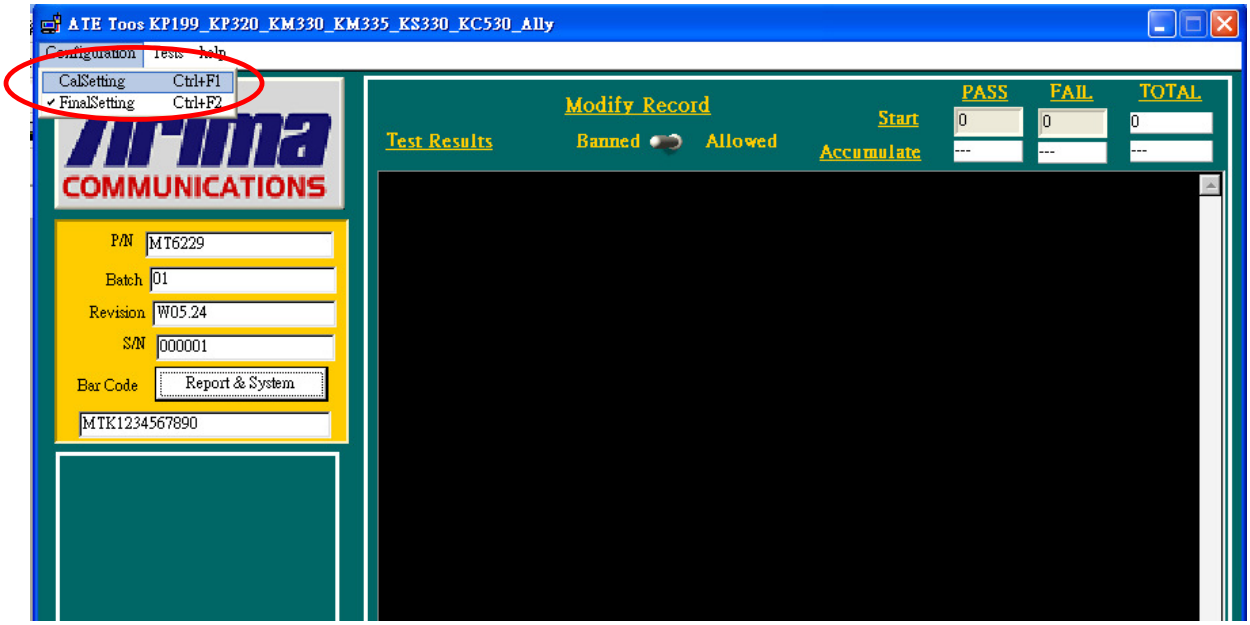
Setting your cable loss



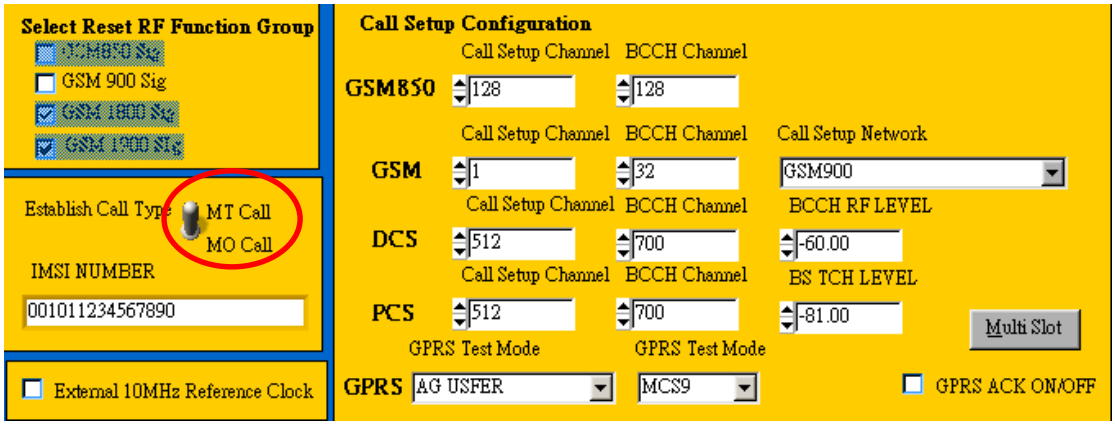
Press Done to save



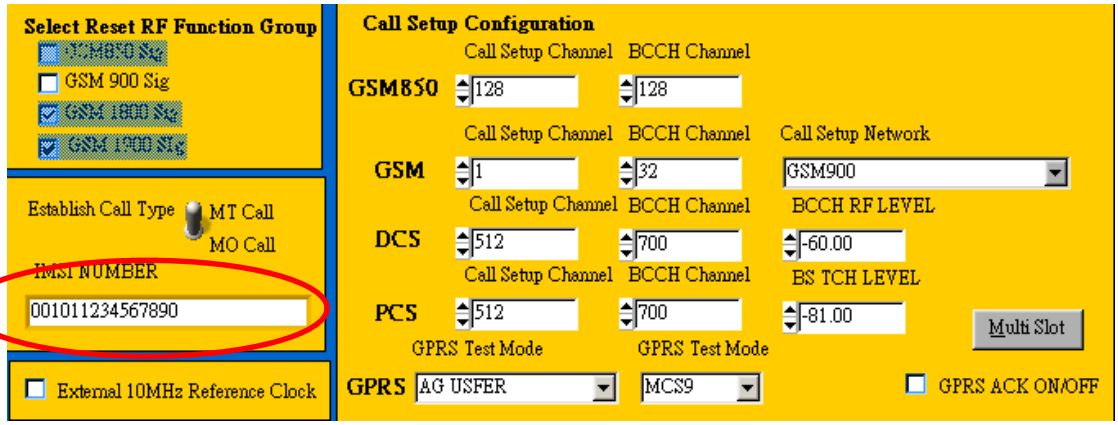
Press Configuration choose Final setting



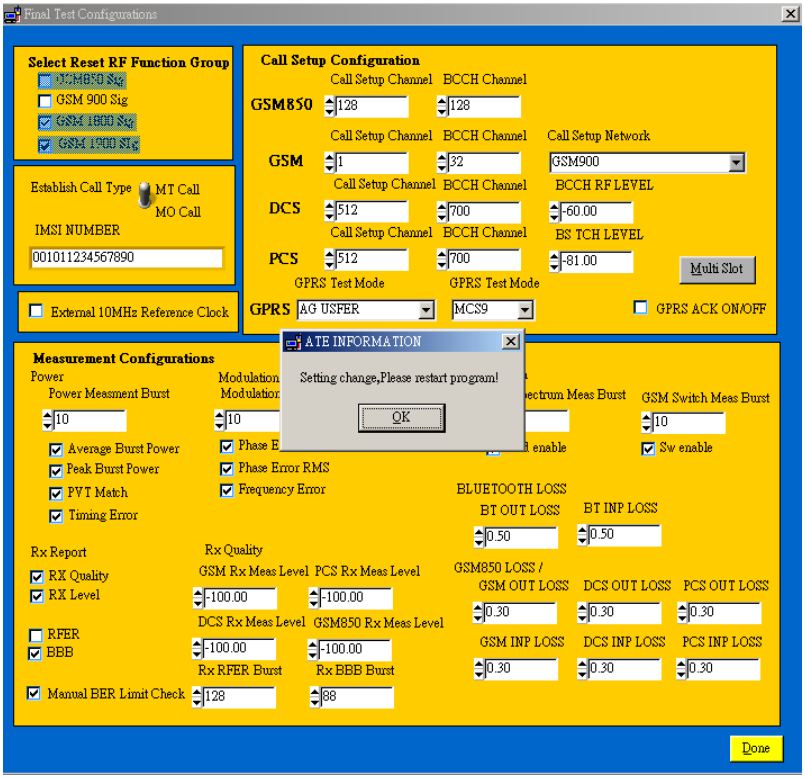
Choose “MT Call” from Establish Call Type



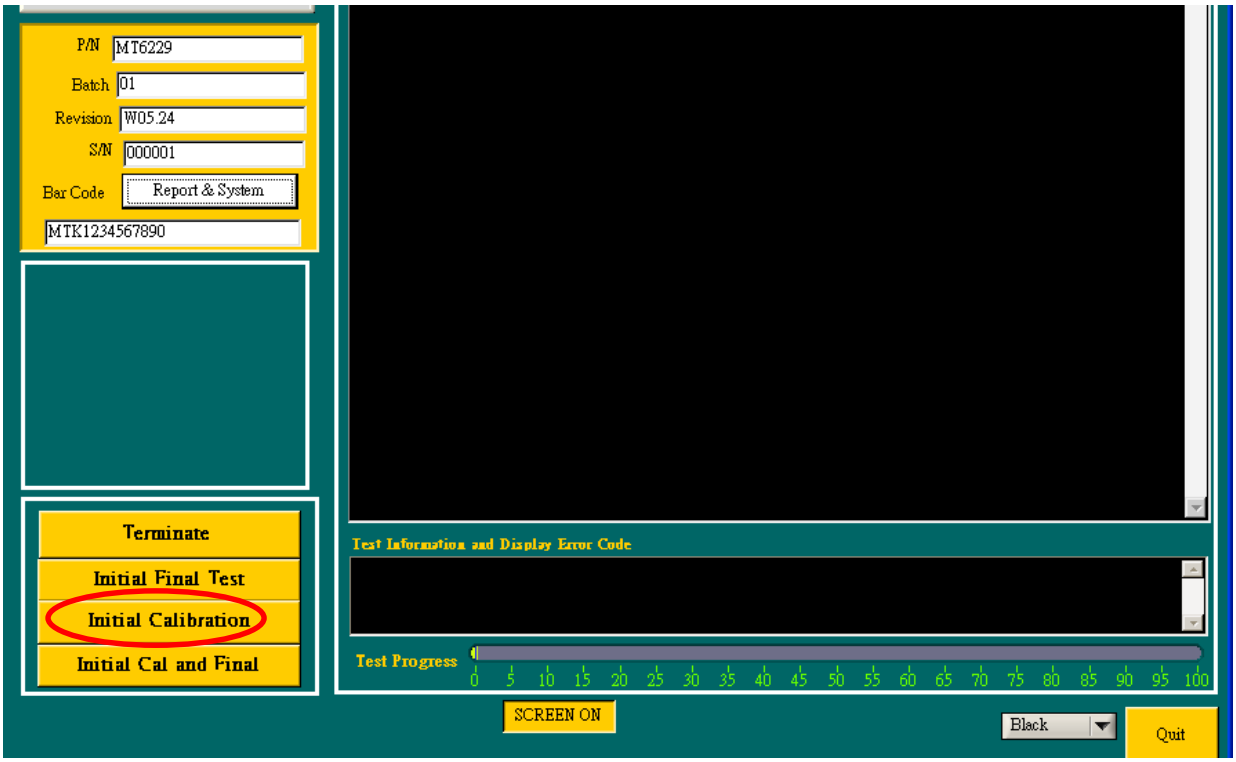
Key in your test SIM card number form IMSI NUMBER



Press “Done” and save your setting

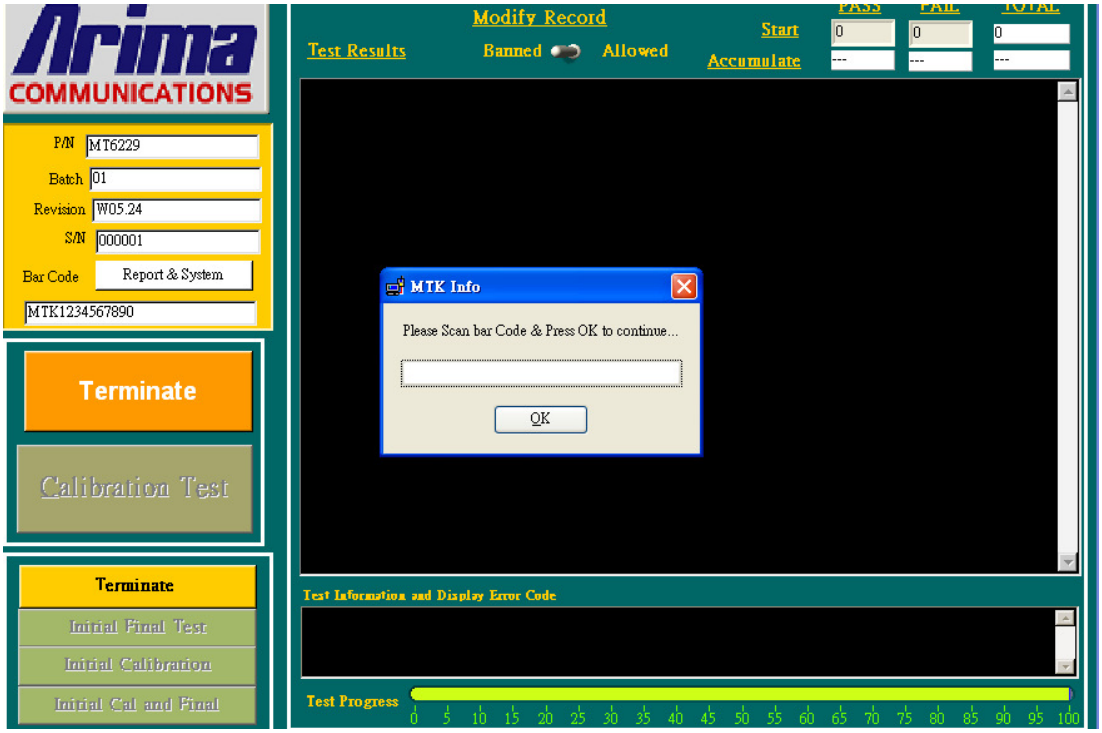


If you want calibration , you can press “initial calibration”

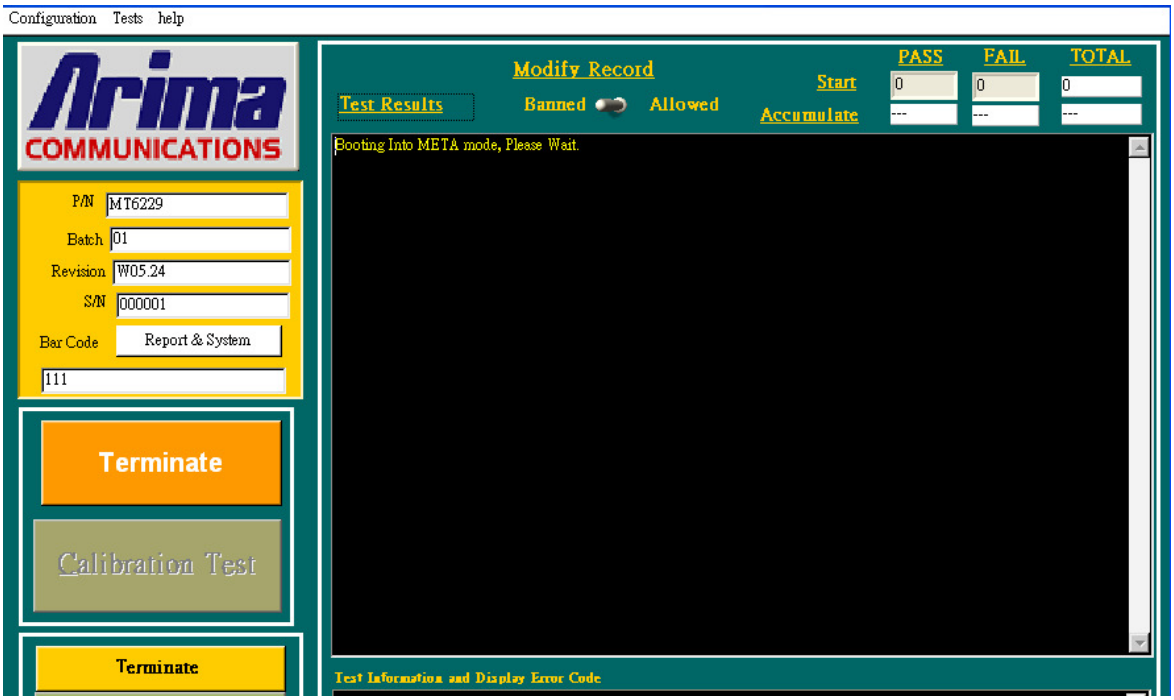


Press Calibration Test

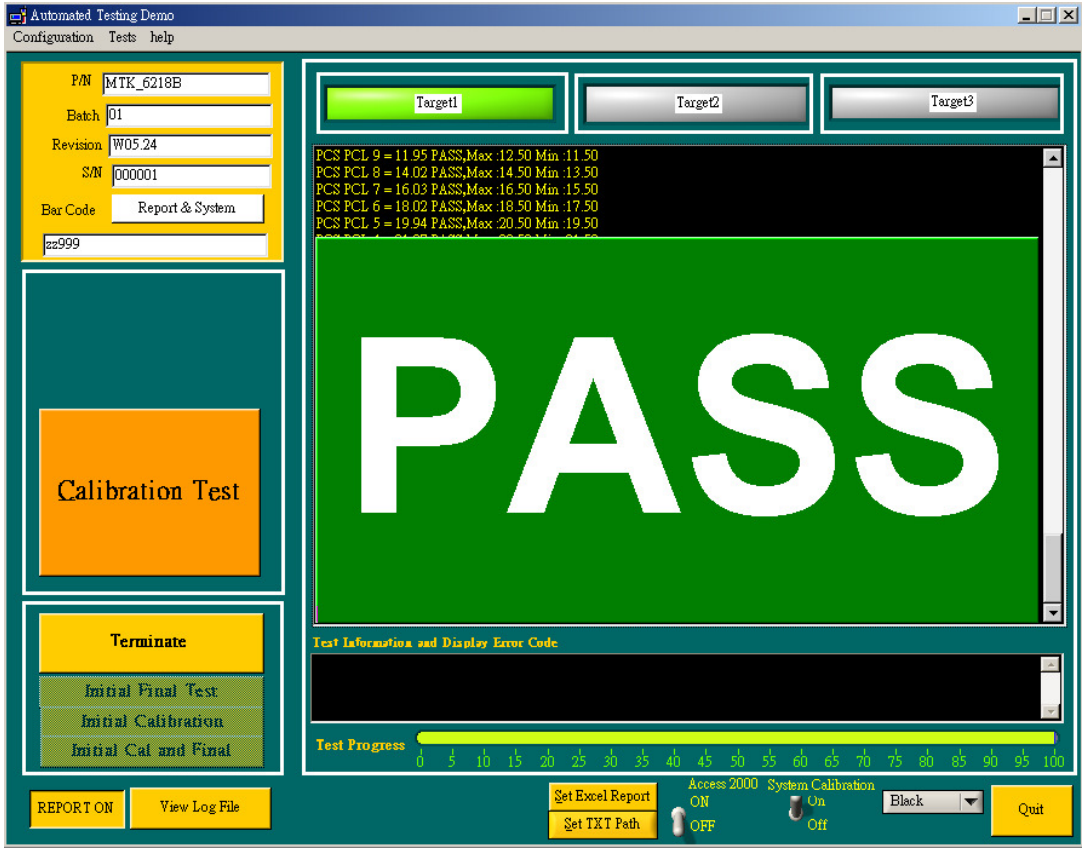
Key-in your phone bar Code



Press your phone of power on key and Start calibration



Calibration is ok and will show “PASS”

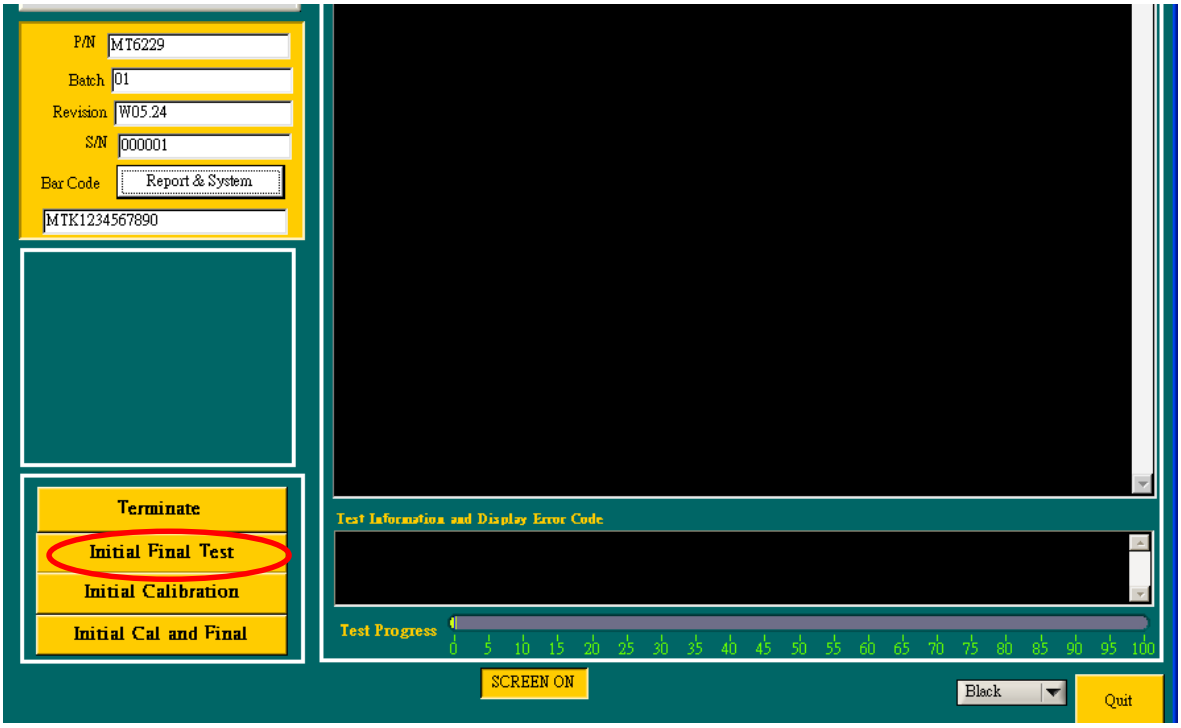


You can see the test report

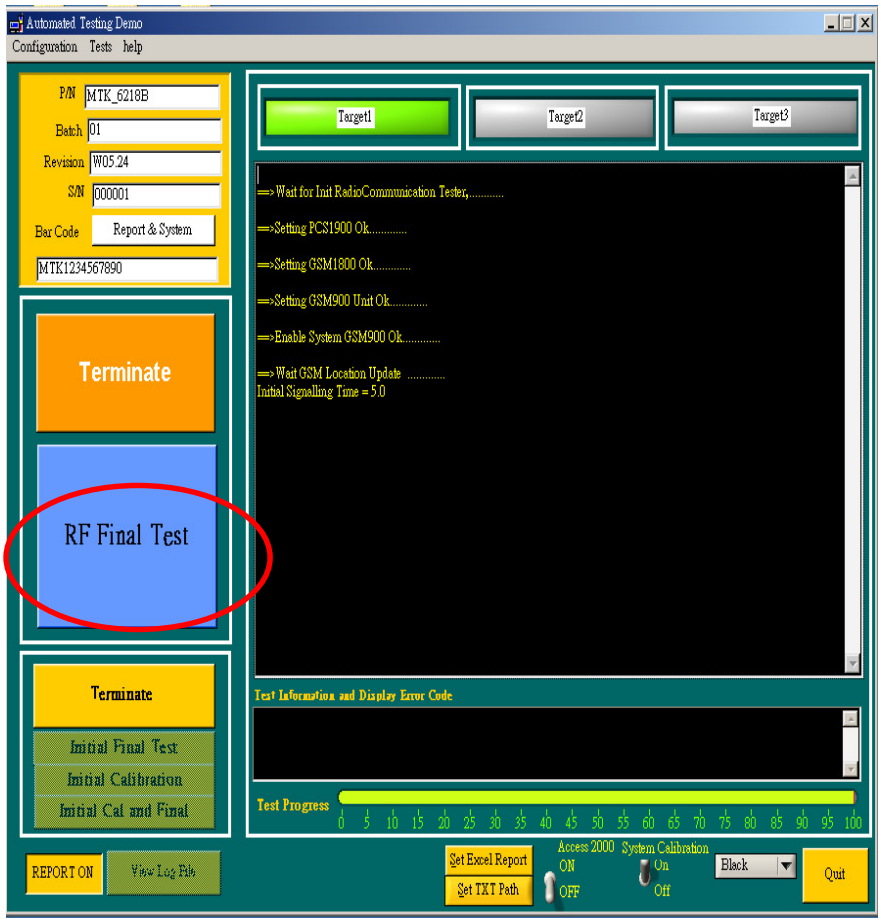
```
------------
 ATE Tool Version:5.0.3
 Part Number:  MTK_6218B
 Serial Number:  000001
 Revision:  W05.24
 Batch:  01
 Bar Code:  qqq
Error Code:  000
------------


        ==>Wait GSM Location Update  ..............
         Enter into META Mode OK
        AFC Calibration OK
Slope=2.824,min:1.000,max:10.000
Use Default Value=3836
        AFC Calibration time=1.64(sec)
PL GSM TCH 15 = 1.25  Pass MAX:3.00   MIN:-3.00
PL GSM TCH 30 = 1.00  Pass MAX:3.00   MIN:-3.00
PL GSM TCH 45 = 0.88  Pass MAX:3.00   MIN:-3.00
PL GSM TCH 60 = 1.25  Pass MAX:3.00   MIN:-3.00
PL GSM TCH 75 = 1.38  Pass MAX:3.00   MIN:-3.00
PL GSM TCH 80 = 1.50  Pass MAX:3.00   MIN:-3.00
PL GSM TCH 100 = 1.25  Pass MAX:3.00   MIN:-3.00
PL GSM TCH 124 = 1.25  Pass MAX:3.00   MIN:-3.00
PL GSM TCH 975 = 1.50  Pass MAX:3.00   MIN:-3.00
PL GSM TCH 1000 = 1.38  Pass MAX:3.00   MIN:-3.00
PL GSM TCH 1023 = 1.00  Pass MAX:3.00   MIN:-3.00
PL DCS TCH 550 = 0.50  Pass MAX:3.00   MIN:-3.00
PL DCS TCH 590 = 1.00  Pass MAX:3.00   MIN:-3.00
```

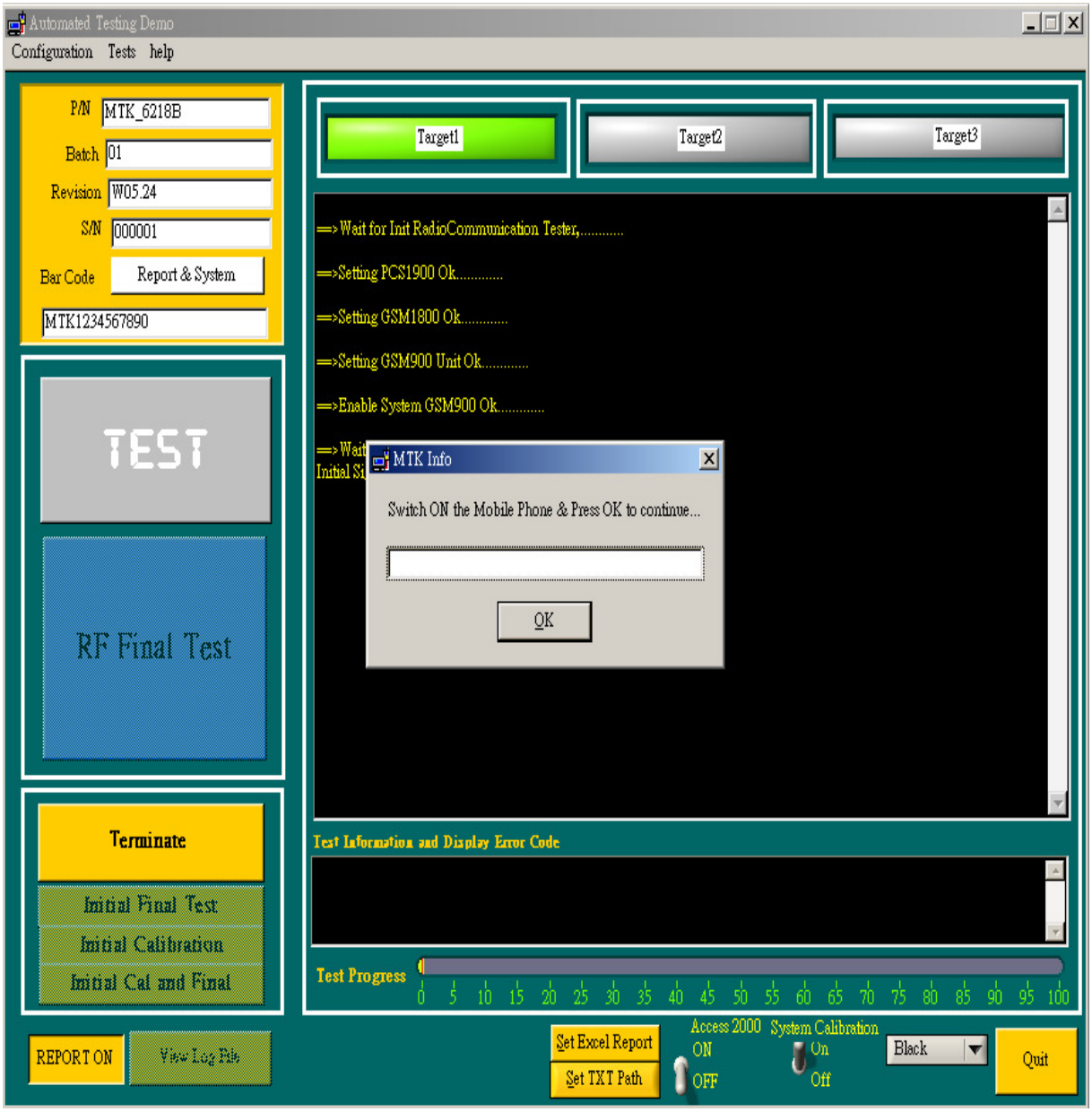
If you want final test , you can press “initial final test “



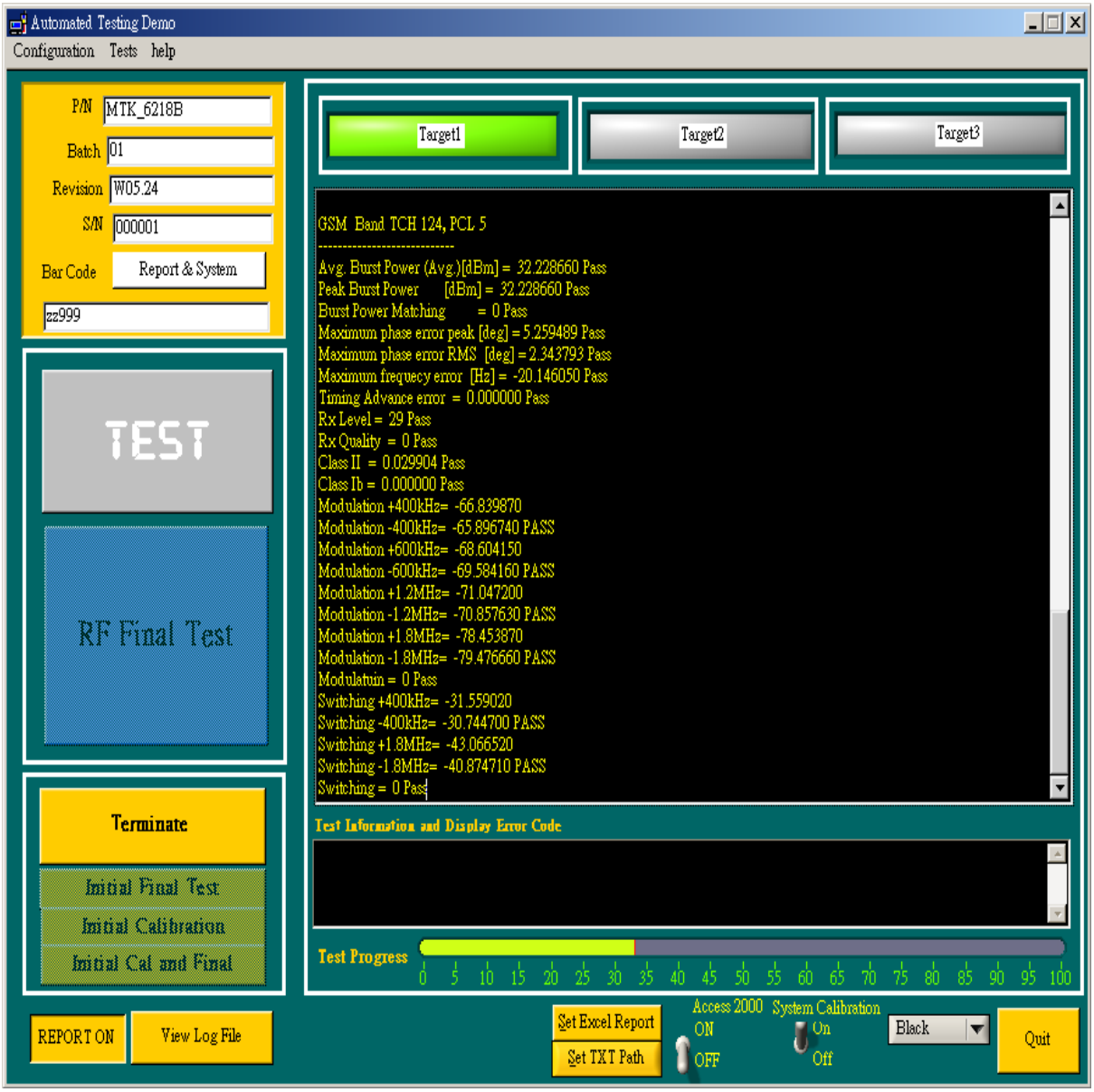
Press “RF Final test”



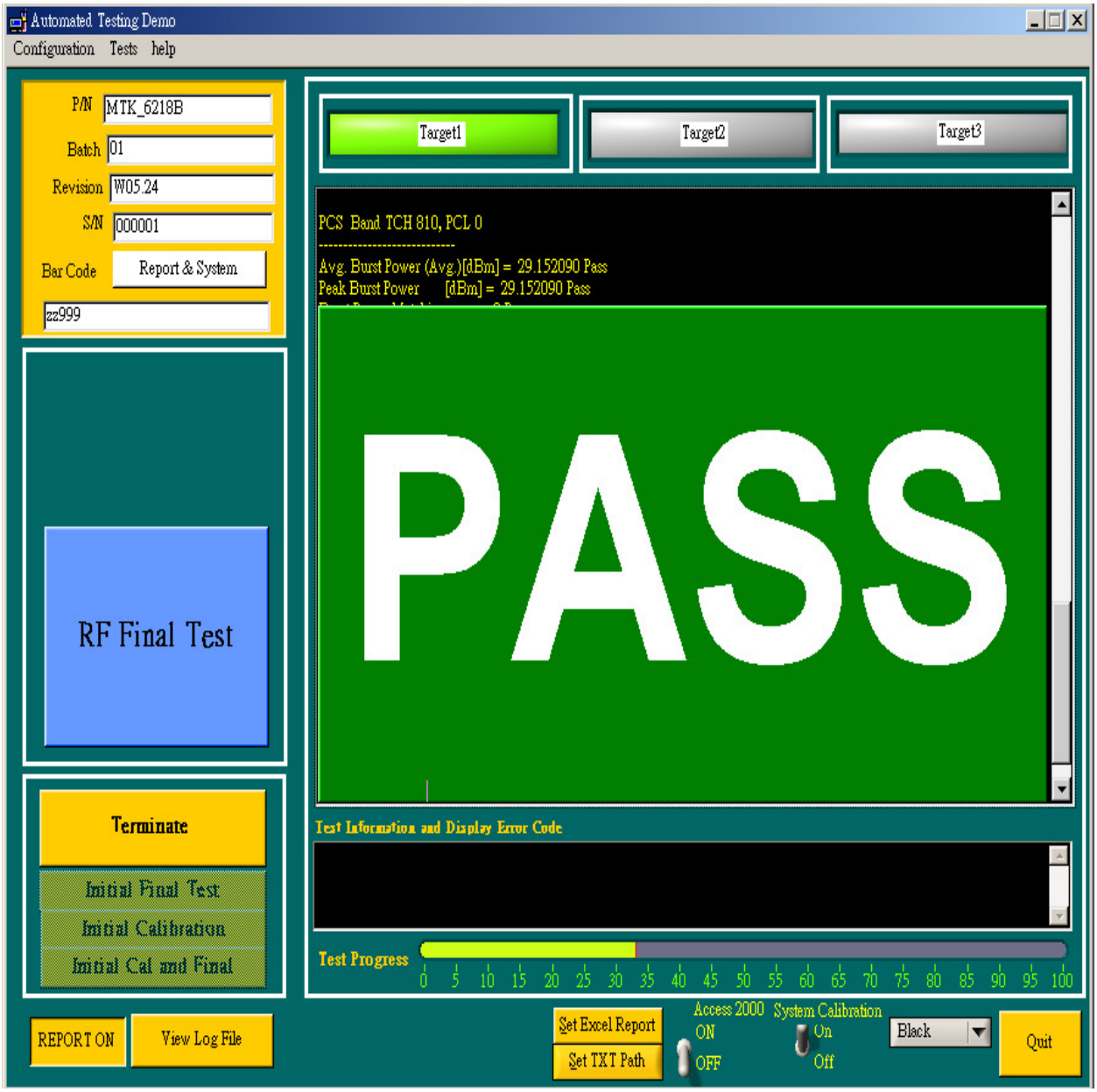
1. Handset to insert SIM card
2. Key-in bar code or IMEI number
3. Power on handset



ATE start final test



If ATE test finish , ATE will show pass

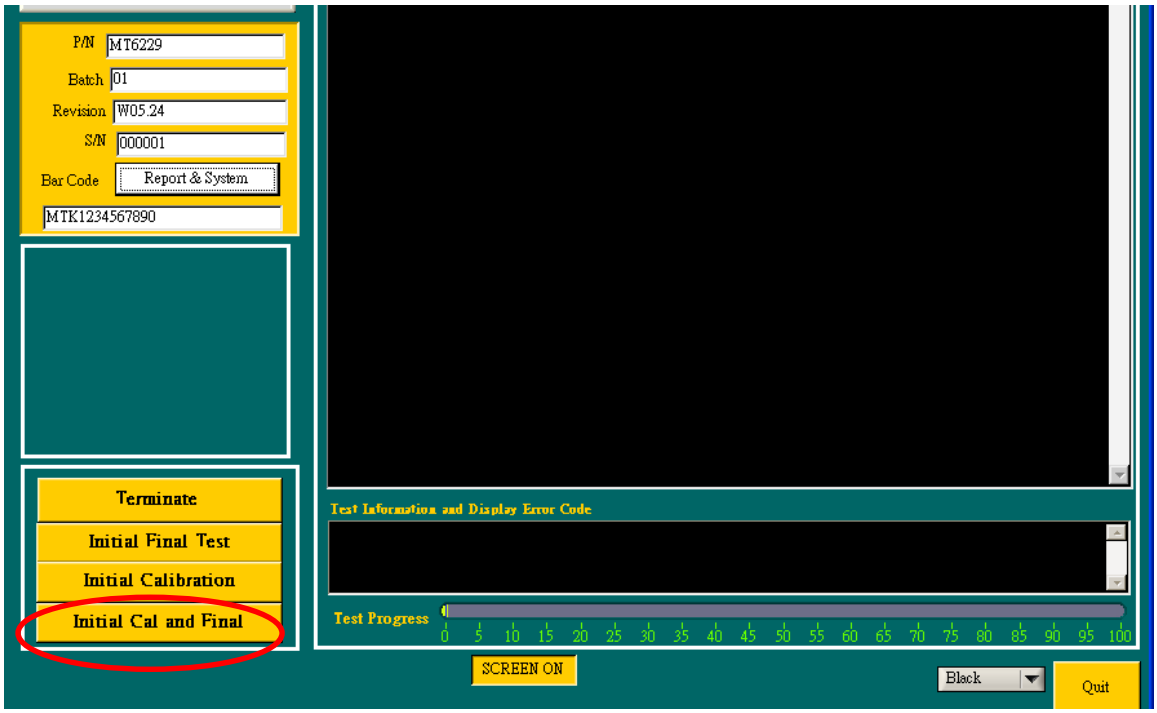


You can see the test report

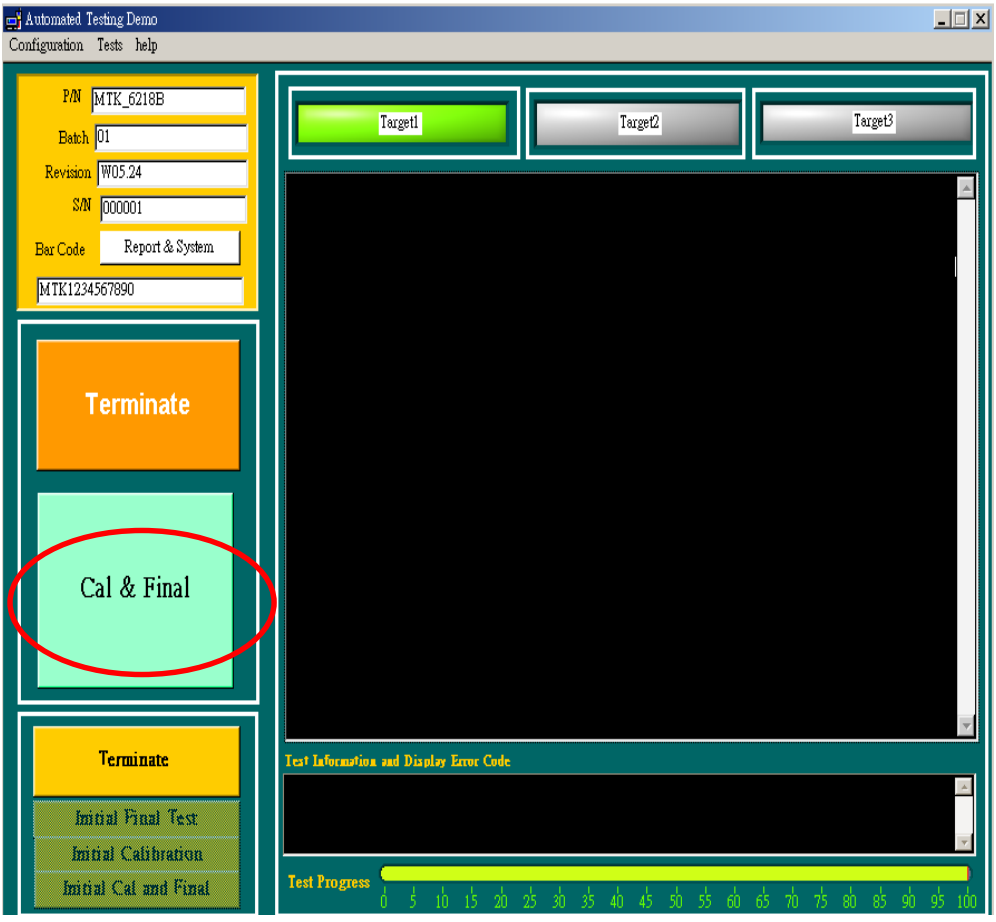
```
------------
 ATE Tool Version:5.0.3
 Part Number:  MTK_6218B
 Serial Number:  000001
 Revision:  W05.24
 Batch:  01
 Bar Code:  qqq
Error Code:  000
------------


        ==>Wait GSM Location Update  ..............
         Enter into META Mode OK
        AFC Calibration OK
Slope=2.824,min:1.000,max:10.000
Use Default Value=3836
        AFC Calibration time=1.64(sec)
PL GSM TCH 15 = 1.25  Pass MAX:3.00   MIN:-3.00
PL GSM TCH 30 = 1.00  Pass MAX:3.00   MIN:-3.00
PL GSM TCH 45 = 0.88  Pass MAX:3.00   MIN:-3.00
PL GSM TCH 60 = 1.25  Pass MAX:3.00   MIN:-3.00
PL GSM TCH 75 = 1.38  Pass MAX:3.00   MIN:-3.00
PL GSM TCH 80 = 1.50  Pass MAX:3.00   MIN:-3.00
PL GSM TCH 100 = 1.25  Pass MAX:3.00   MIN:-3.00
PL GSM TCH 124 = 1.25  Pass MAX:3.00   MIN:-3.00
PL GSM TCH 975 = 1.50  Pass MAX:3.00   MIN:-3.00
PL GSM TCH 1000 = 1.38  Pass MAX:3.00   MIN:-3.00
PL GSM TCH 1023 = 1.00  Pass MAX:3.00   MIN:-3.00
PL DCS TCH 550 = 0.50  Pass MAX:3.00   MIN:-3.00
PL DCS TCH 590 = 1.00  Pass MAX:3.00   MIN:-3.00
```

If you want initial cal and final test , you can press “initial cal and final test”



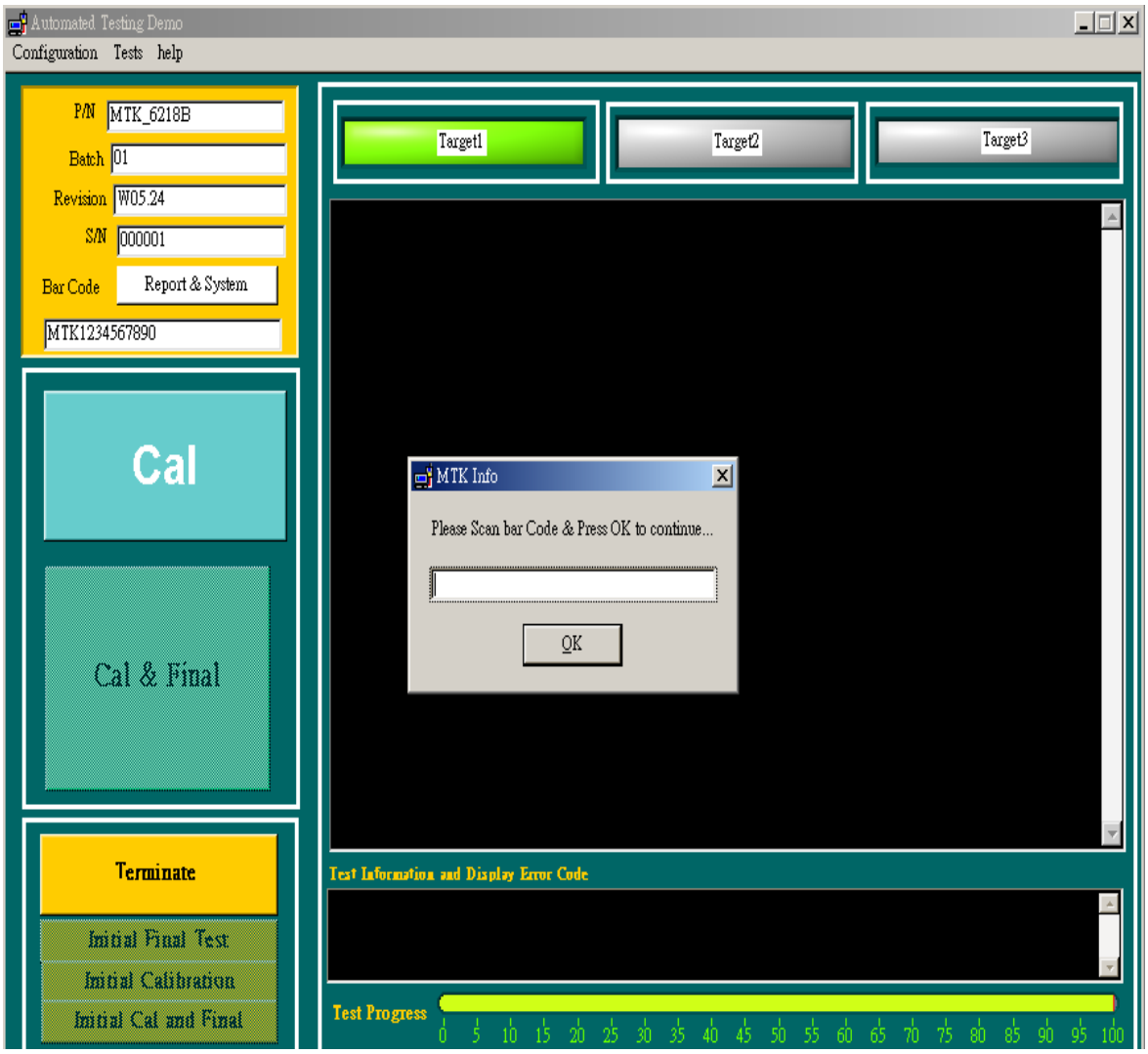
Press “Cal & Final”



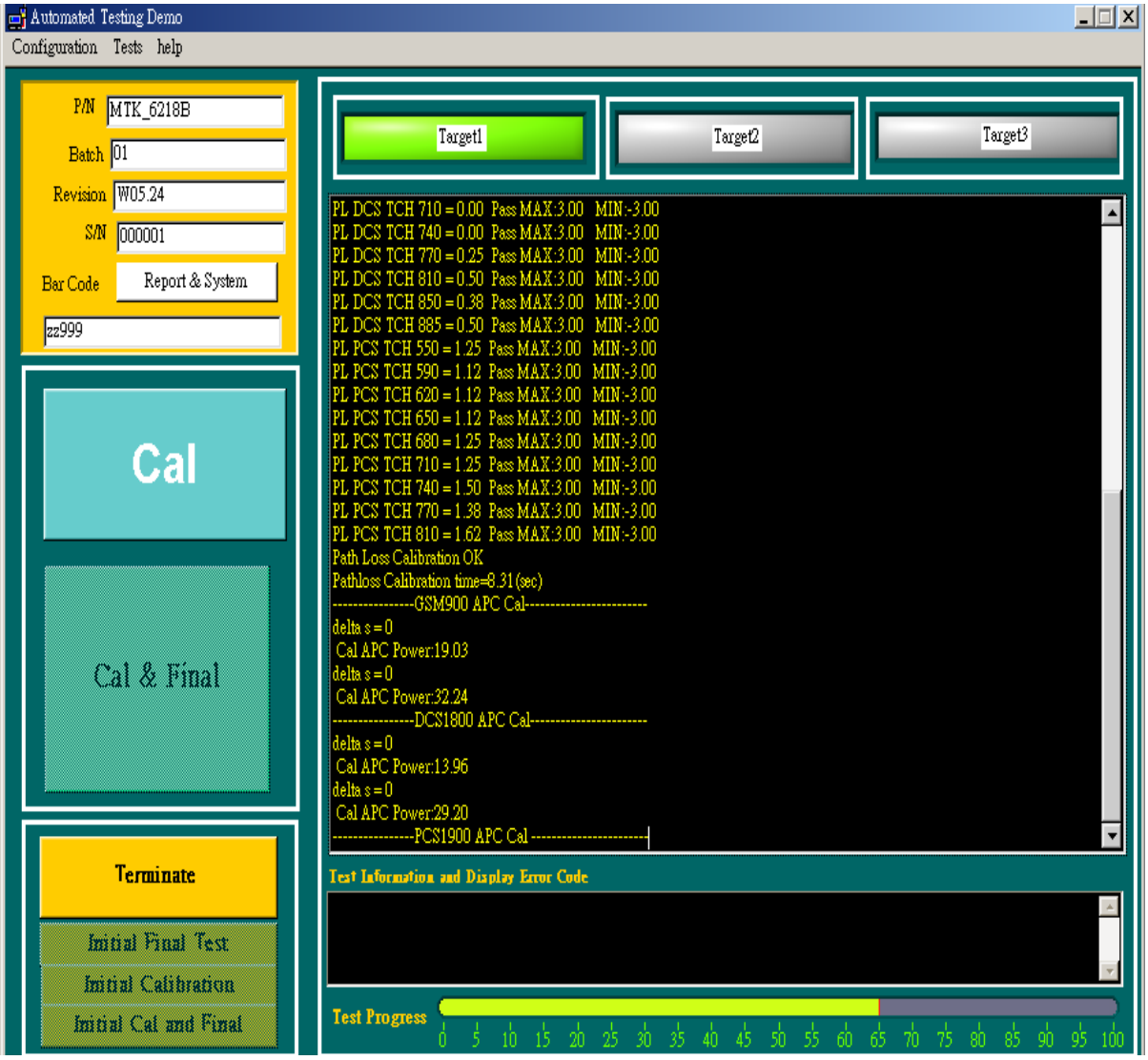
1.Handset to insert SIM card

2.Key-in bar code or IMEI number

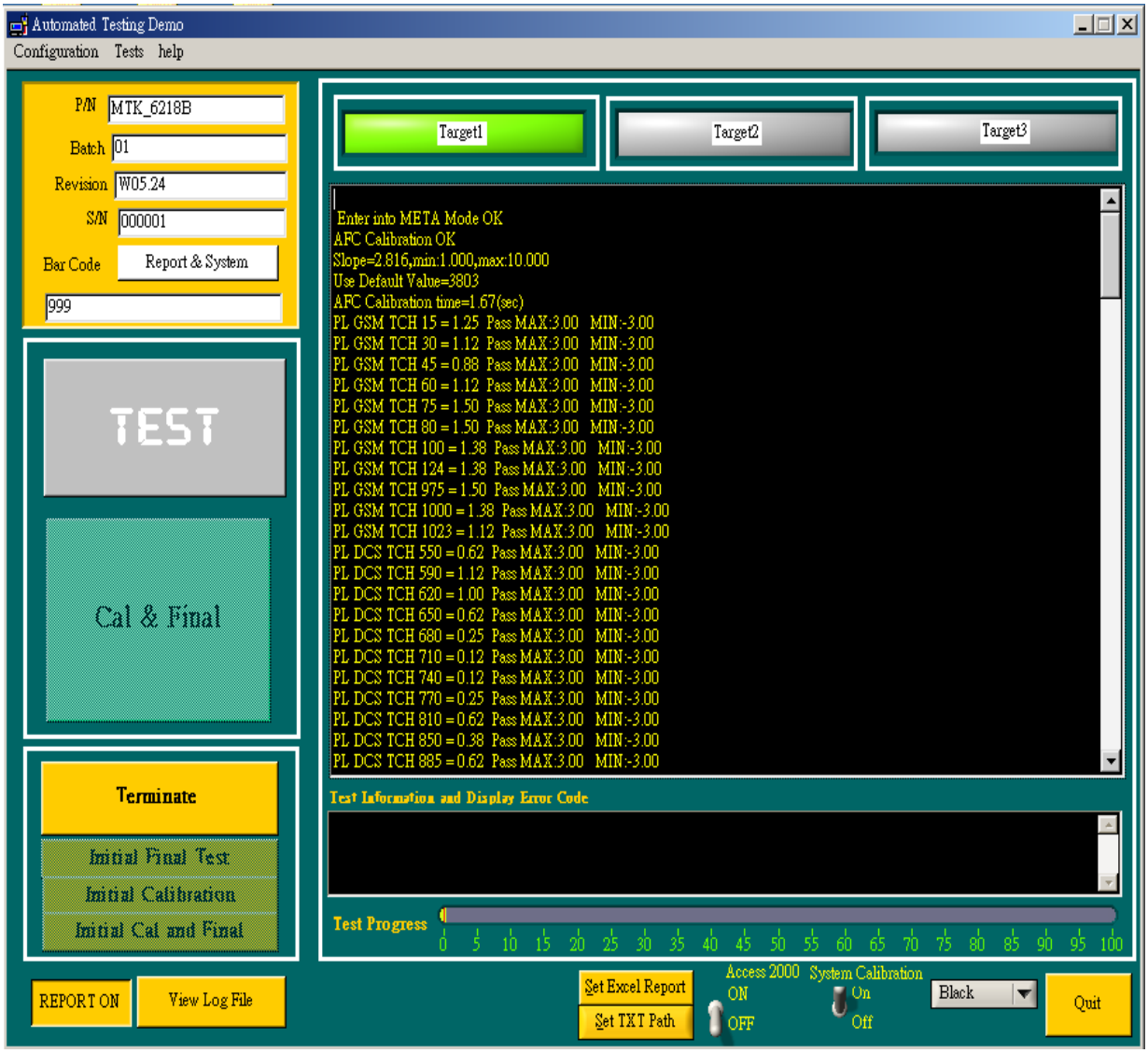
3.Power on handset



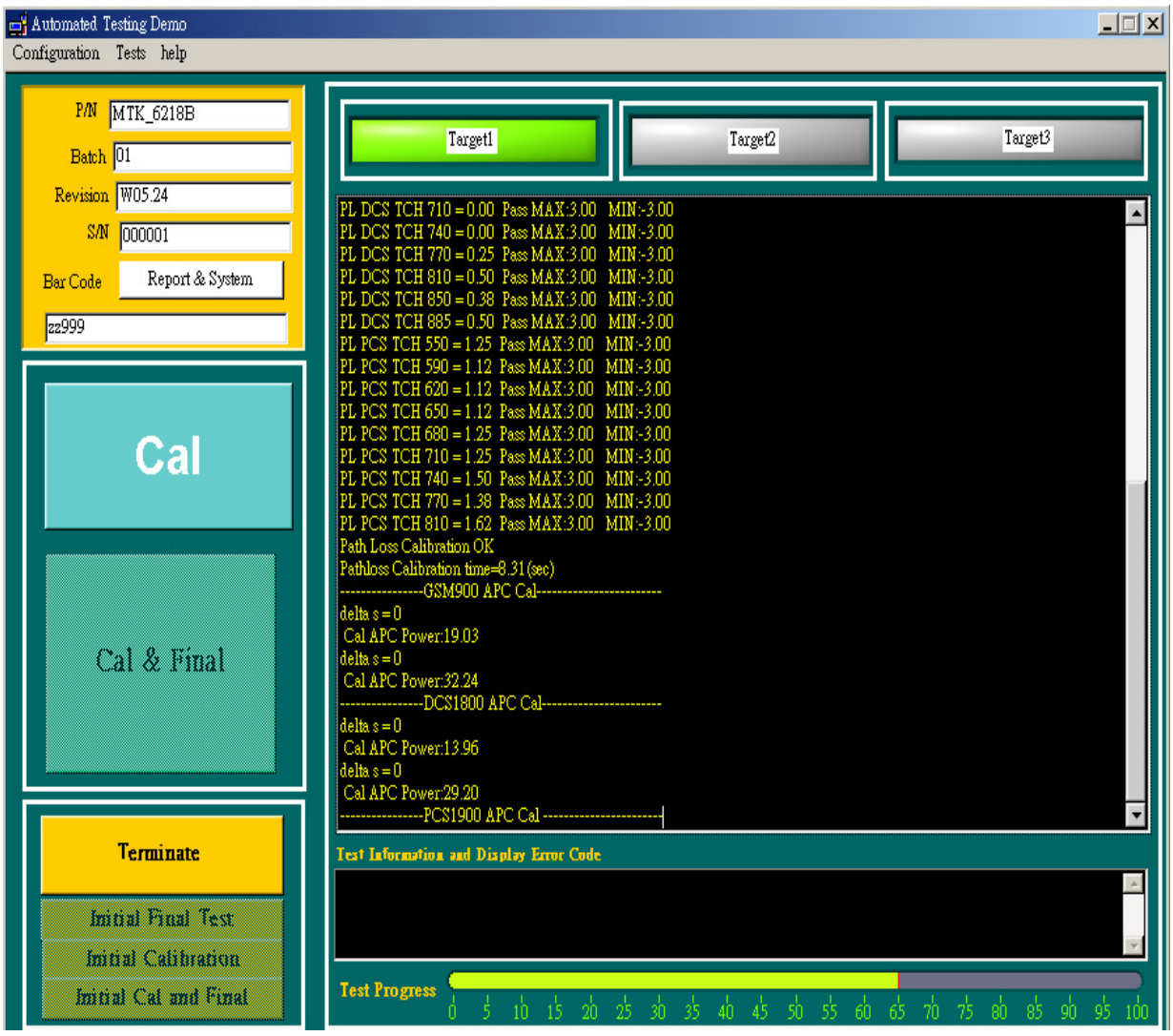
Start calibration



Calibration finish and power on handset again

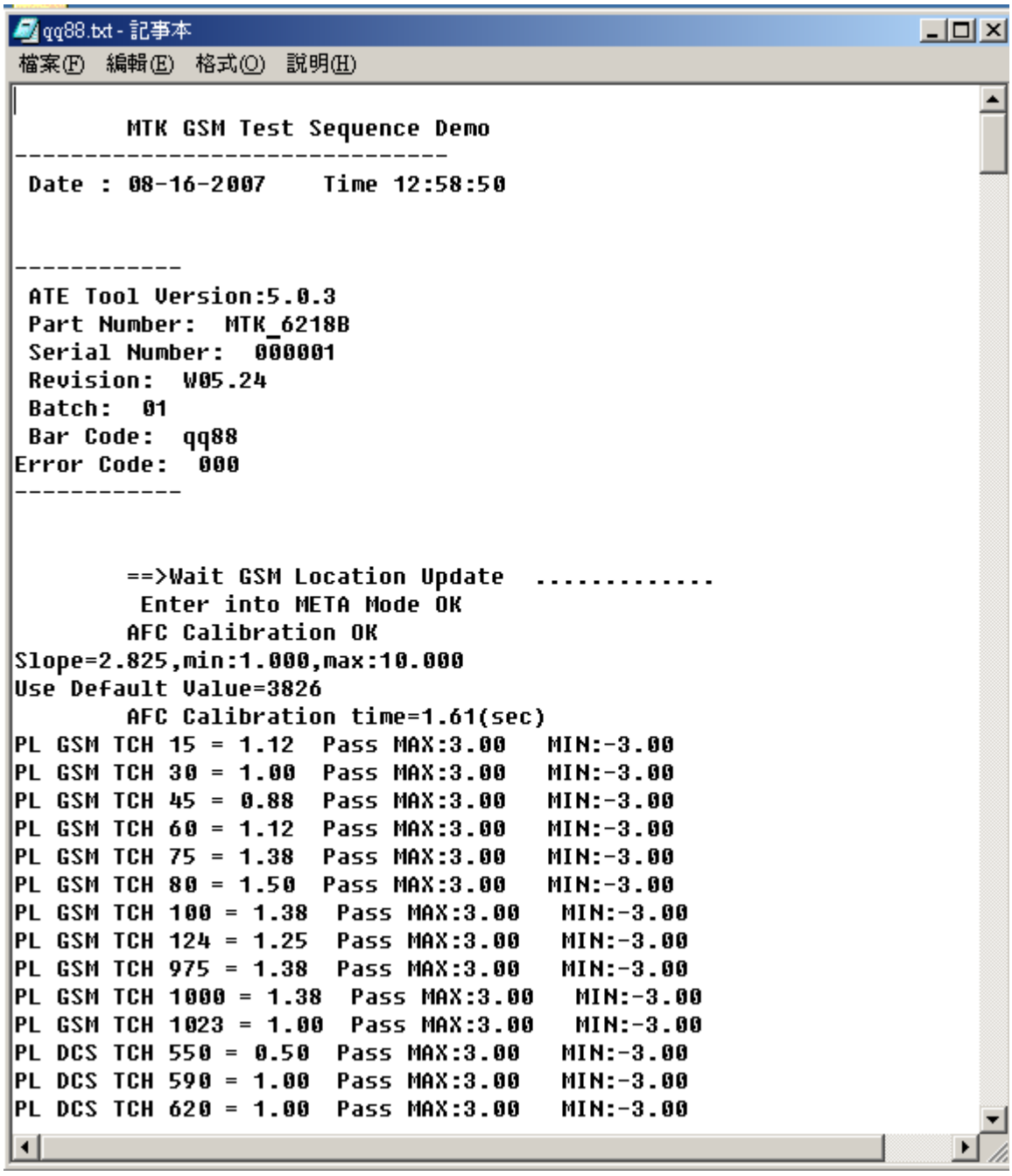


Start final test



Finish “Cal & Final test”

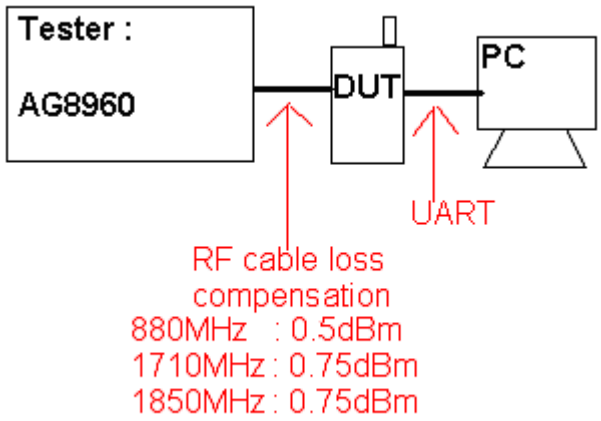
Ate show the test report



12. STAND ALONE TEST

12.1Test Configuration & Expected Outcome

Test Configuration :



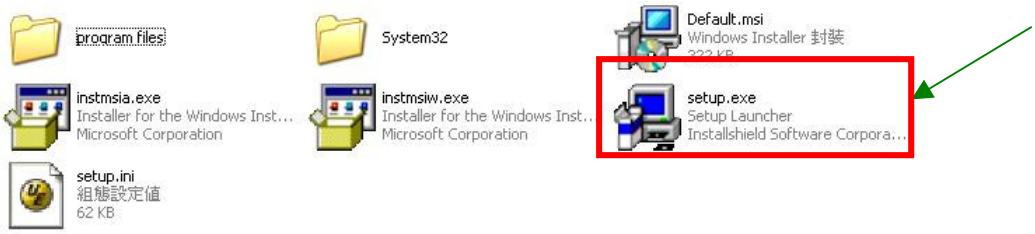
Expected Outcome :

TX	power	: 32.5	+/-	1.5 dBm	for GSM900
TX	power	: 29.5	+/-	1.5 dBm	for DCS1800, PCS1900
RX	power	: -85	+/-	4 dBm	for GSM900, DCS1800, PCS1900

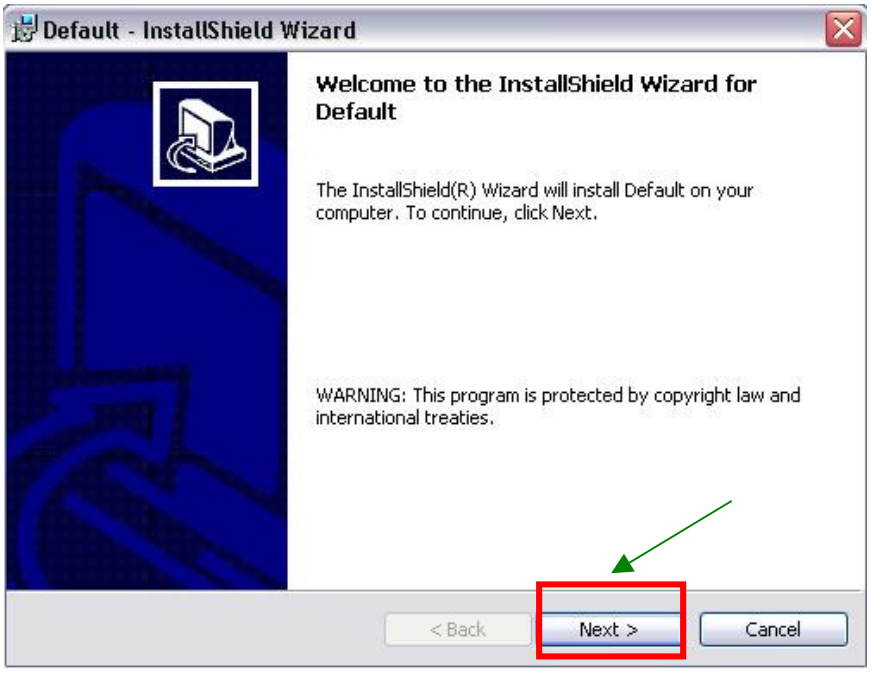
12.2 META Install & RF TX & RX Check

META Tool Install process :

(1) Press “setup.exe” then press

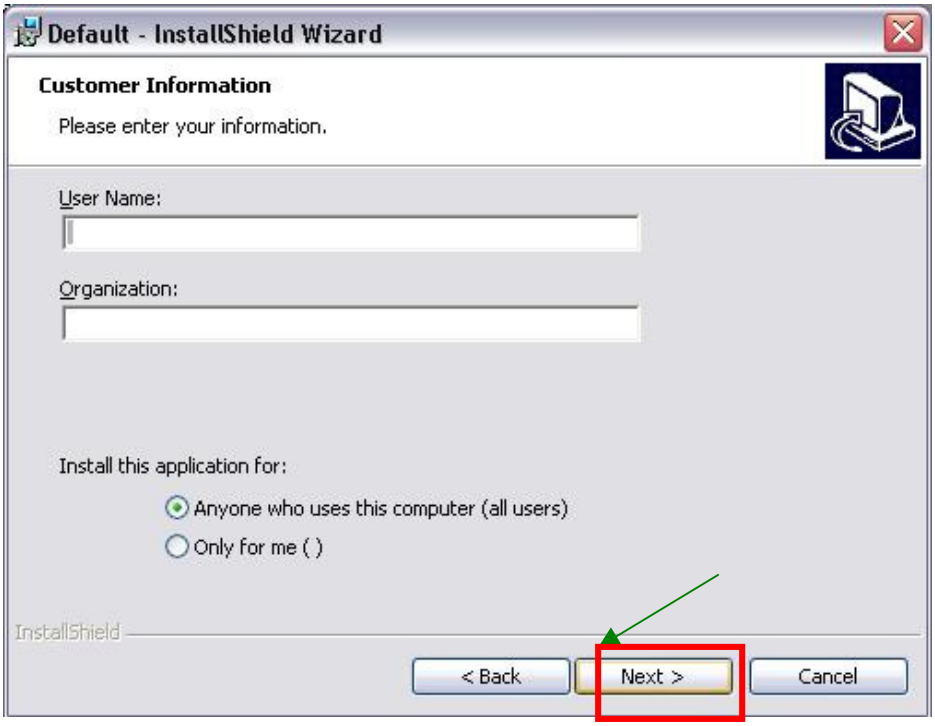


(2) Install Process – press “Next”

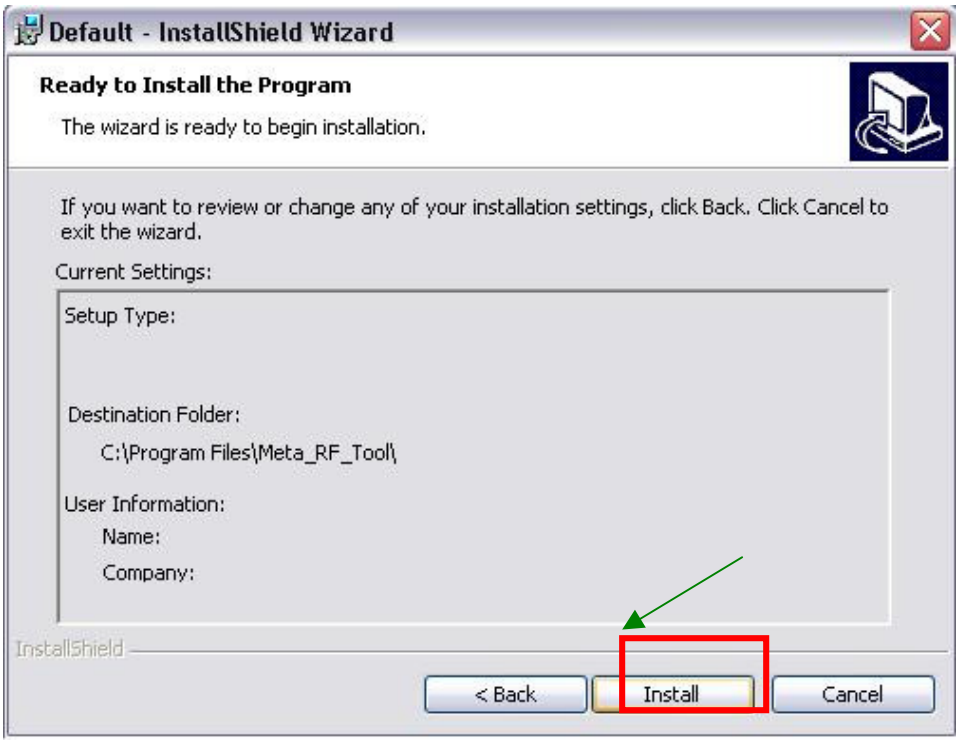


(3) Install Process – press “Next”

(4) Install Process – press “Next”



(5) Install Process – press “Next”



(6) Install Process

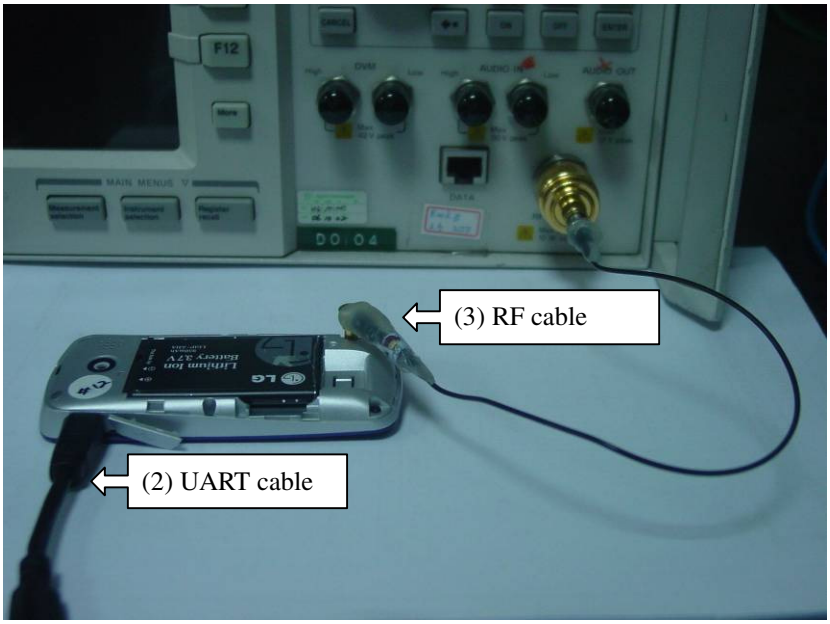
(7) Install Process – press “Finish”

12.3 RF RX Check :

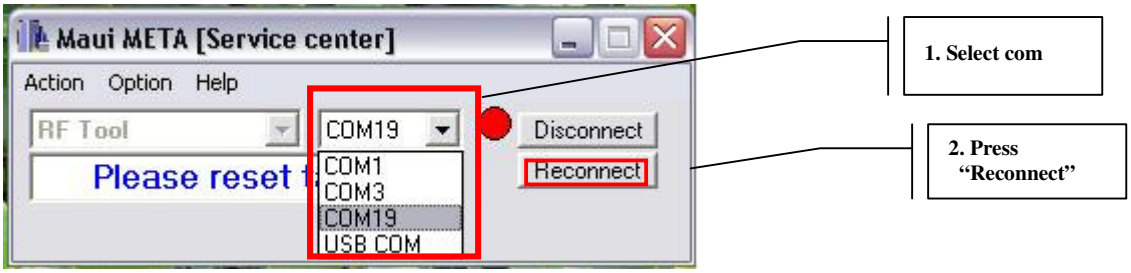
(1) Open “ Meta_RF_Tool ”

(2) Pull in UART cable

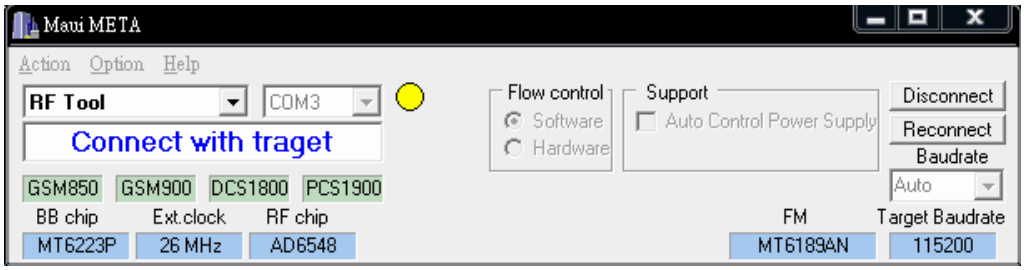
(3) Inset RF-Cable (AG8960)



(4) Select proper com port and press “Reconnect”.



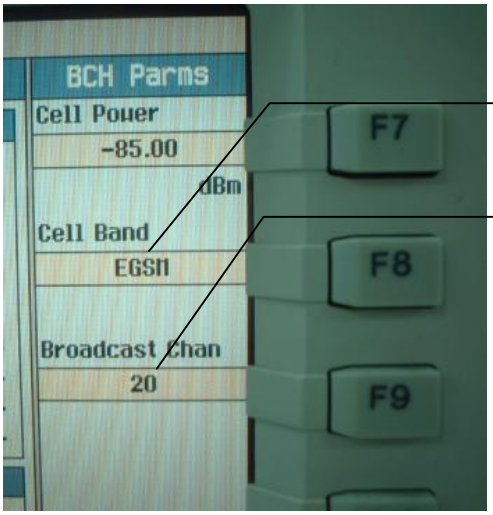
Turn on the mobile phone. Shows “connect with target” after link up the MS in engineer mode. Select “RF Tool”.



(5) RX Test (AG8960) ---

A. to set "BCH Parms"

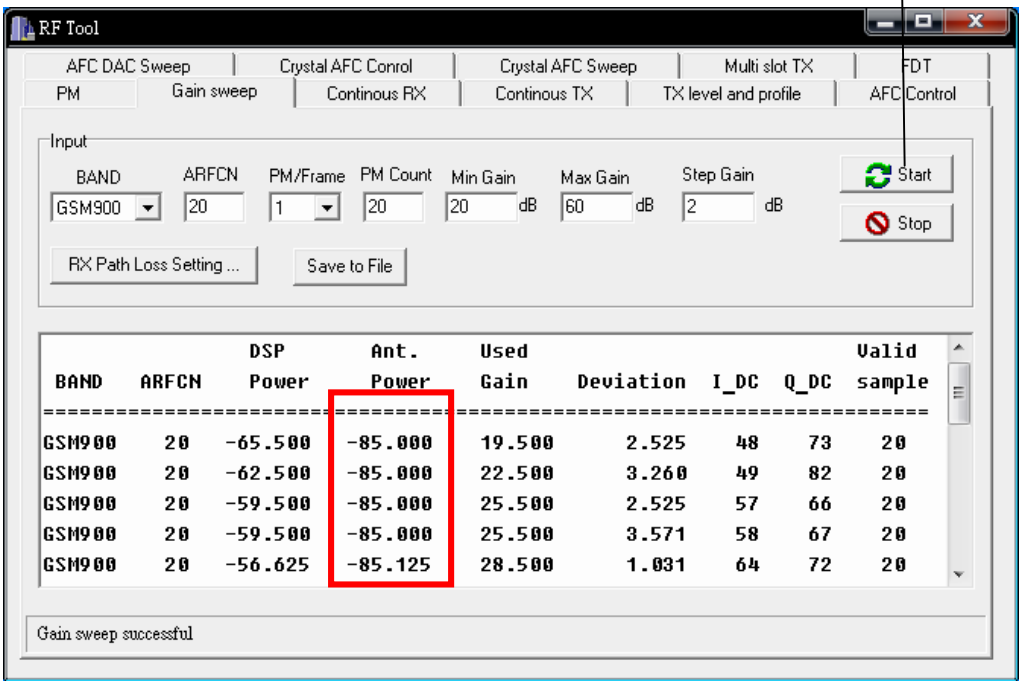
B. to set input values in Gain sweep of RF tool the same as equipment.



1.Select Band (GSM/DCS/PCS)

2 Set channel members

3. Press "Start"



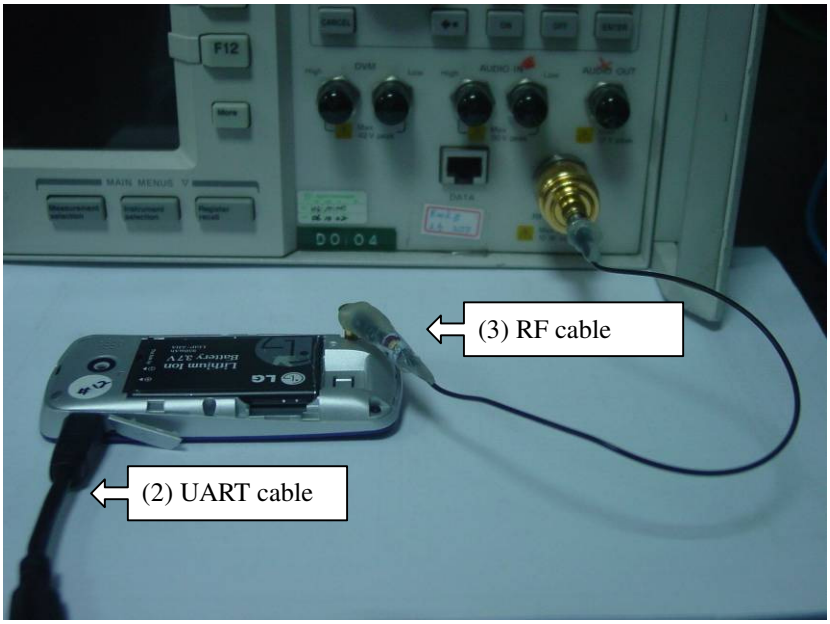
(6) RX Test --- check values of Ant. Power with Cell power inside +/- 4 dBm.

12.4 RF TX Check :

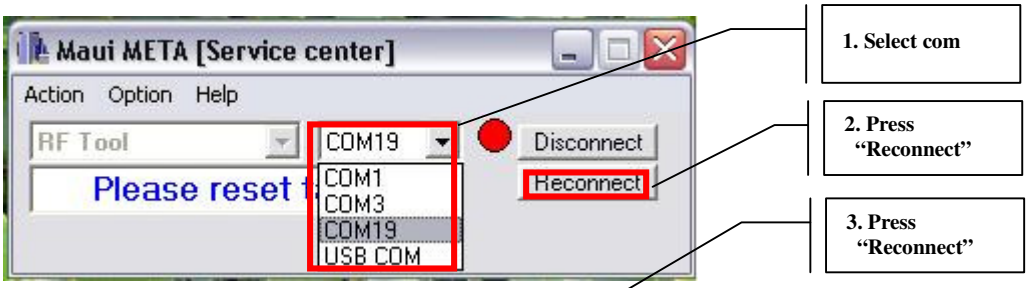
(1) Open " Meta_RF_Tool "

(2) Pull in UART cable

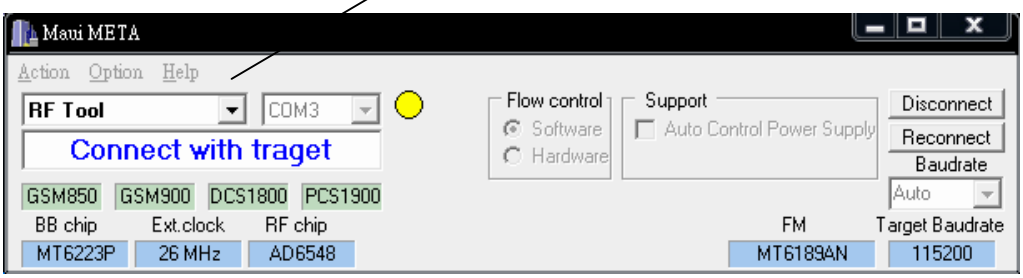
(3) Inset RF-Cable (AG8960)



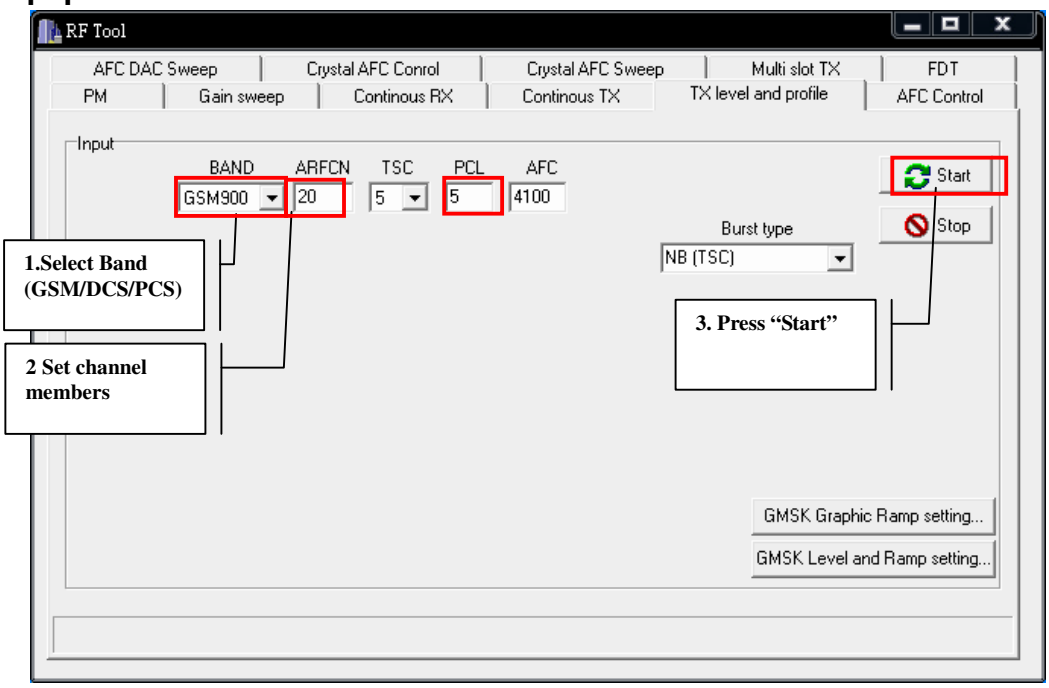
(4) Select proper com port and press "Reconnect" then turn on the mobile phone.



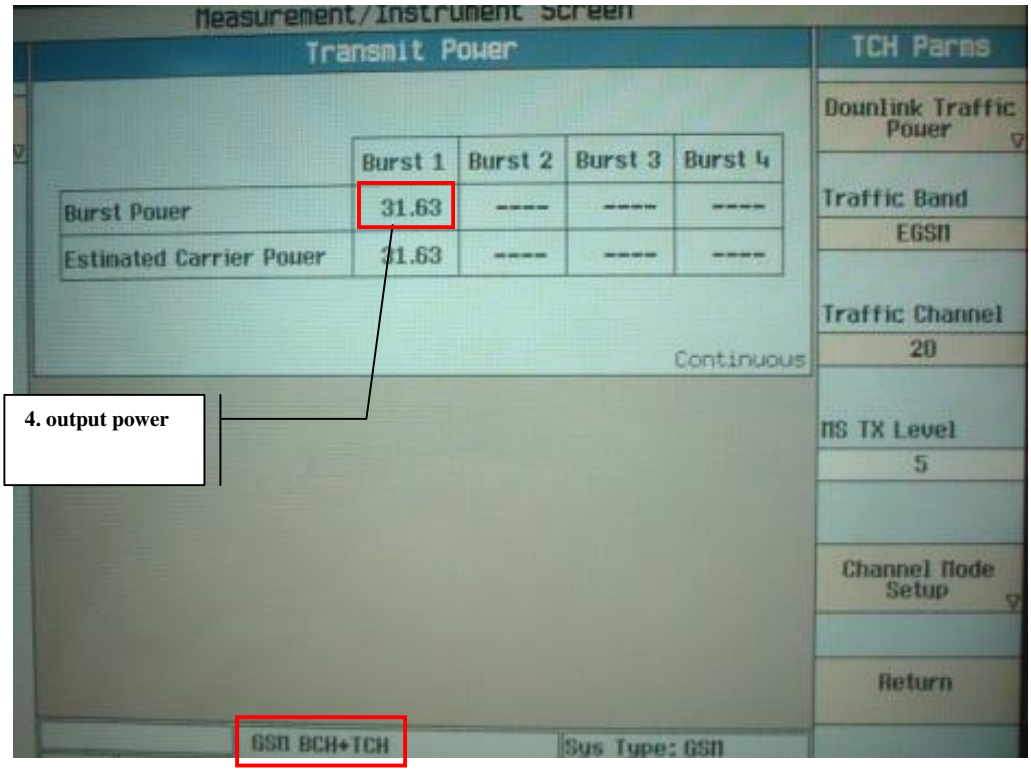
It'll Show "connect with target" after links up the MS in engineer mode. Select "RF Tool".



(5) TX Test (AG8960) --- Need to set “Band”, “Channel” and “Power Level” the same as equipment.



It is the result to measure output power from equipment in non-signaling mode. check values of Burst Power inside +/- 4 dBm.



13. EXPLODED VIEW&REPLACEMENT PART LIST

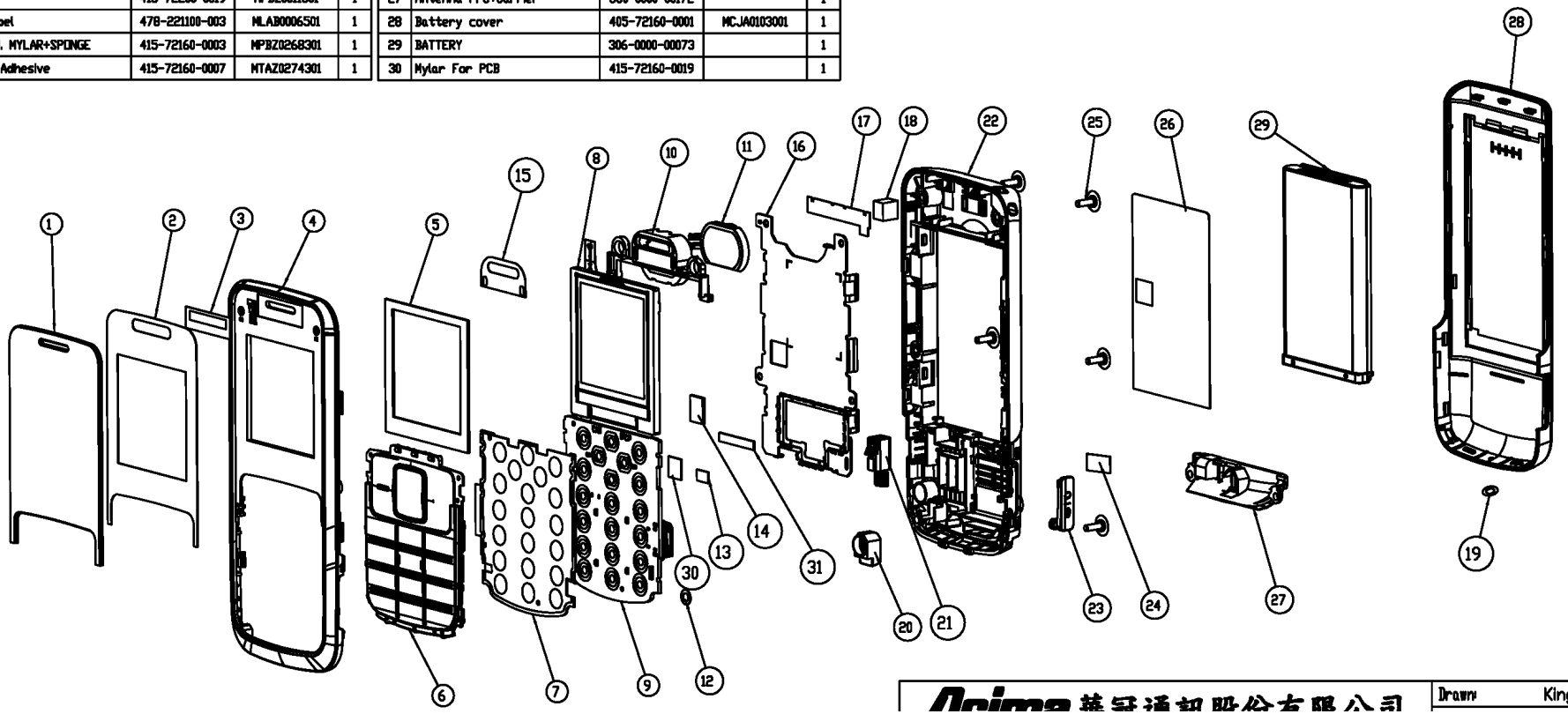
13.1 Exploded view

ITEM	Part Name	Part No.	LG Part No.	Q'ty
1	Main Lens	403-72160-0001	MWAC0134401	1
2	Main Lens Adhesive	415-72160-0005	MTAD0119901	1
3	Speaker Mesh	415-72160-0001	MFBZ0009101	1
4	Front Cover	401-72160-0001	MCJK0119101	1
5	LCM SPONGE	415-72160-0002	MPBG0104101	1
6	KEYPAD	404-71530-0001	AKAC0006601	1
7	Metal Dome	415-72160-0009	AIDC A0108101	1
8	LCM	327-0000-00084	SVLM0038401	1
9	Main PCB	8-01-7218N0-01		1
10	SPEAKER Rubber	415-72160-0013	MHGZ0032701	1
11	Speaker	313-0000-00137	SUVT0006401	1
12	Mic mesh	415-72200-0019	MFBZ0011601	1
13	water label	478-221100-003	MLAB0006501	1
14	LCM CONN. MYLAR+SPONGE	415-72160-0003	MPBZ0268301	1
15	Speaker Adhesive	415-72160-0007	MTAZ0274301	1

ITEM	Part Name	Part No.	LG Part No.	Q'ty
16	Shielding case For BB	415-72160-0012		1
17	Rear cover sponge	415-72160-0006	MPBZ0268401	1
18	Rear cover sponge for SPK	415-72160-0014	MPBN0084601	1
19	Mic mesh	415-72200-0019	MFBZ0011601	1
20	MIC RUBBER	415-72160-0011	MHGZ0032801	1
21	Vibrator	320-0000-00060	SJMY0010401	1
22	Rear cover	402-72160-0001	MCJN0113701	1
23	I/O cover	405-72160-0002	MCCE0057701	1
24	Antenna Cap Mylar	415-72160-0004		1
25	Screw ML6-0.35*5	409-00000-0105		6
26	IMEI LABLE	478-721600-001		1
27	Antenna FPC+Carrier	330-0000-00172		1
28	Battery cover	405-72160-0001	MCJA0103001	1
29	BATTERY	306-0000-00073		1
30	Mylar For PCB	415-72160-0019		1

ITEM	Part Name	Part No.	LG Part No.	Q'ty
31	Mylar2 For PCB	415-72160-0020		1

MODIFICATIO	
VER	DESCRIPTION

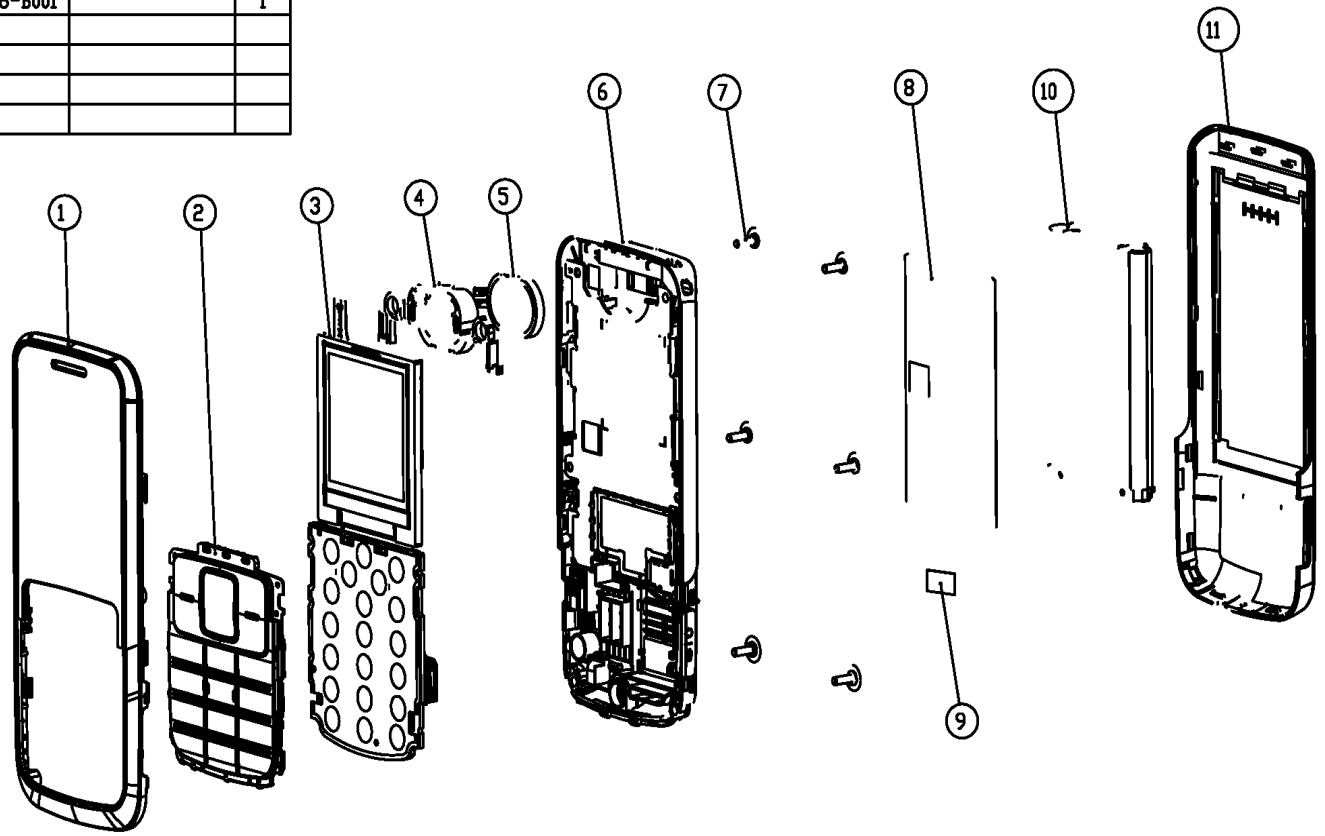


Drawn King

Ass'y exploded view

ITEM	Part Name	ARIMA P/N	LGE P/N	Q'ty
1	Front Cover Sub-Ass'y	8M01-7216-B001	ACGK0150101	1
2	KEYPAD	404-72160-0001	AKAC0006601	1
3	MAIN BOARD ASS'Y	8M08-7218-N001		1
4	SPEAKER Rubber	415-72160-0013	MHGZ0032701	1
5	Speaker	313-0000-00137	SUVT0006401	1
6	Rear Cover Sub- Ass'y	8M02-7216-S001	ACGM0147901	1
7	Screw M1.6-0.35*5	409-00000-0105		6
8	IMEI LABLE	478-721600-001		1
9	Antenna Cap Mylar	415-72160-0004		1
10	Battery	306-0000-00073		1
11	Battery Cover sub-Ass'y	8M03-7216-B001		1
12				
13				
14				
15				

VER	DESCRIPTION



13. Replacement Part list

Level	Part name	Arima part number	LG part number	Description	Qty
. 1	Adapter	331-0000-00132		Travel Charger_150~240V_5.10V_700mA_FCC_STA-U34RD_EN50075_HAN SHIN_DongDo_MICRO USB 5PIN,SSAD0032701	1
. 1	Headset	333-0000-00077		Headset Stereo Channel Type_EMB-LGE011STKC_16 Ohm_Mic.S/N'58 'dB_- 42 'dB_PT.CRESYN_Micro USB 5 pin, 750 + 250 mm	1
. 1	Battery	306-0000-00071		Li-ion Battery Cell Packing_3.7V_950mAh_BLACK_LGIP-531A-SBPL0090501_LG INNOTEK_Bar code:SBPL0090501	1
. 1	Battery Cover Ass'y	8M03-7216-B001		Battery Cover Sub-Ass'y_7216_BLACK_Battery Cover sub-Ass`y	1
.. 2	Battery Cover	405-72160-0001	MCJA0103001	Cover_7216_BLACK_PC_Painting_Battery Cover_A-TEK PRECISION(SUZHOU)_N/A	1
.. 2	MIC MESH	415-72200-0019	MFBZ0011601	FILTER_7220_BLACK_FELT MESH_N/A_MIC MESH_GUAN YI(WUJIANG)_N/A	1
.. 2	Front Cover Ass'y	8M01-7216-B001	ACGK0150101	Front Cover Sub-Ass'y_7216_BLACK_Front Cover Sub-Ass'y	1
... 3	Front Cabinet	401-72160-0001	MCJK0119101	Front Cabinet_7216_BLACK_PC_Painting_Front Cover_A-TEK PRECISION(SUZHOU)_N/A	1
... 3	Main Lens Adhesive	415-72160-0005	MTAD0119901	ADHESIVE_7216_TRANSPARENT_ADHESIVE_N/A_Main Lens Adhesive_GUAN YI(WUJIANG)_N/A	1
... 3	Speaker Mesh	415-72160-0001	MFBZ0009101	FILTER_7216_BLACK_FELT MESH_N/A_Speaker Mesh_GUAN YI(WUJIANG)_N/A	1
... 3	LCM SPONGE	415-72160-0002	MPBG0104101	GASKET_7216_BLACK_PORON_N/A_LCM SPONGE_GUAN YI(WUJIANG)_N/A	1
... 3	Adhesive For Speaker Rubber	415-72160-0007	MTAZ0274301	ADHESIVE_7216_TRANSPARENT_ADHESIVE_N/A_Adhesive For Speaker Rubber_GUAN YI(WUJIANG)_N/A	1
.. 2	Main Key	404-72160-0001	AKAC0006601	Key_7216_BLACK_PC+Rubber_Painting_ENGLISH_KEYPAD_MISUNG POLYTECH CO._N/A	1
.. 2	MAIN BOARD ASS'Y	8M08-7218-N001		PCBA Sub-Ass'y_7218_NATURAL_MAIN BOARD ASS'Y	1
..... 5	FL500	326-0000-00039	SFDY0002401	Filter Dual Mode_EXC24CP121U_100MHz_PANASONIC_Noise,4pin-0504,120Ohm,I=500mA	1
..... 5	D303	309-0000-00029	EDSY0018201	Diode Schottky_RB520S30T1G_N/A_2pin_SOD-523_200mA/0.6V_ON SEMI_N/A	1
..... 5	D304	309-0000-00001	EDNY0013701	Diode Zener_BZX585-B5V6_N/A_2pin_SOD-523_5.6V/300mW_PHILIPS_± 2%	1
..... 5	D400,D401	309-0000-00097	EDLL0009001	LED Single Color_48-213-BHC-ZM2P1QY-3C_BLUE_2pin_0603_5mA/<57 mcd_EVERLIGHT_Side View	2
..... 5	U101	311-0000-00600		I.C POWER AMP MODULE(RF)_SKY77518-21_MCM_20 PINS_NoMemory_SKYWORKS_6*8*1.15mm	1
..... 5	U102	326-0000-00117		Filter SAW_B39182B9308G110_942.5MHz/1842.5MHz_EPCOS_FOR GSM RX,50/150 OHM-SMD10PIN	1

..... 5	U103	311-0000-00740	EUSY0399701	I.C TRANSCEIVER_AD6548BCPZ_LFCSP_32 PINS_NoMemory_MTK_N/A	1
..... 5	U200	311-0000-00681	EUSY0409801	I.C BASEBAND PROCESSOR_MT6223DA/AN-L_TFBGA_224 BALLS_NoMemory_MTK_FOR GSM/GRRS	1
..... 5	U201	311-0000-00788	EUSY0409901	I.C STACKED MEMORY_TV00570002CDGB_TFBGA_81 BALLS_128M+32M_TOSHIBA_FLASH+SRAM	1
..... 5	U305,U500	311-0000-00631	EUSY0377101	I.C ANALOG SWITCH_STG5223QTR_QFN_10 PINS_NoMemory_ST_DUAL SPDT	2
..... 5	U306	311-0000-00632	EUSY0377301	I.C CHARGE_MP26021DQ-LF-Z_QFN_10 PINS_NoMemory_MPS_FOR Li-ion BATTERY,2.8V/1A	1
..... 5	U401	311-0000-00731	SSBD0005301	I.C DC-DC CONVERT_AAT3192IJQ-1-T1_SC70_10PINS_NoMemory_AAT_Charge Pump LED Driver	1
..... 5	U501	311-0000-00762	EUSY0394901	I.C FM MODULE_Si4708-B-GMR_QFN_16 PINS_NoMemory_SILICON LABS_N/A	1
..... 5	U502	311-0000-00689	EUSY0376801	I.C AUDIO POWER AMPLIFIER_TPA6202A1ZQVR_BGA_8 Balls_NoMemory_TI_Vo=3.6V, 0.63 W, 8 Ohm	1
..... 5	U503	311-0000-00159	EUSY0408501	I.C ANALOG SWITCH_NC7SB3157P6X-NL_SC70_6 PIN_NoMemory_FAIRCHILD_SPDT	1
..... 5	X101	305-0000-00092	EXSY0025201	Crystal Oscillator_TZ1387A_26.0 MHZ_±10.0ppm_SMD-3.2*2.5mm-4Pin_TAI-SAW_N/A	1
..... 5	X200	305-0000-00026	EXSY0024801	Crystal Oscillator_Q13MC1461000200_32.768KHZ_±20ppm_SMD-7*1.5mm-4Pin_EPSON TOYOCOM_MC-146 type	1
..... 5	J400	314-0000-00358	ENBY0048501	CON. FPC CONNECTOR_FH26W-13S-0.3SHW(05)_0.600 mm_13 pin_HIROSE_H=1.0mm	1
..... 5	J300	314-0000-00391	ENBY0050001	CON. BATTERY CONNECTOR_BTP-03QF4G_3.000 mm_3 pin_OCTEKCONN_H=5.7mm	1
..... 5	J301	314-0000-00207	ENBY0056401	CON. SIM CARD CONNECTOR_SMR14-067142_2.540 mm_6 pin_ACRON_11.3*7.62*4.9mm	1
..... 5	J500	312-0000-00040	SUMY0012401	Omni-MIC._SOM4013SB-Z422-C3310_58 'dB_- 42dB_± 2.0dB_Φ4.0*1.30mm_NA_SMD Type_GONGDA_N/A	1
..... 5	J503	314-0000-00430		CON. MICRO USB CONNECTOR_GU073-5P-SD-E1500_0.650 mm_5 pin_LS MTRON_H=3mm	1
..... 5	AT101,AT102	314-0000-00229	ENRY0009101	CON. SPRING CONNECTOR_OG-321022_NA_1 pin_KITAGAWA_N/A	2
..... 5	JRF101	314-0000-00070	ENBY0048801	CON. RF CONNECTOR WITH SWITCH_MM8430-2610RB3_3.000 mm_6 pin_MURATA_N/A	1
..... 5	RF Shielding case	415-72160-0010		CASE_7216_SILVER_STAINLESS STEEL+COPPER-NICKEL-ZINC ALLOY_N/A_Shielding case For RF_PLIGHT(JIANGSU)_Frame+Cover	1
..... 5	USB Shield Cover	415-72160-0016		CASE_7216_SILVER_COPPER-NICKEL-ZINC ALLOY_N/A_USB Shield Cover_PLIGHT(JIANGSU)_N/A	1
... 3	Metal Dome	415-72160-0009	ADCA0108101	DOME_7216_WHITE_PLASTIC+METAL_N/A_Metal Dome_PRINTEC_LGF	1
... 3	MIC MESH	415-72200-0019	MFBZ0011601	FILTER_7220_BLACK_FELT MESH_N/A_MIC MESH_GUAN YI(WUJIANG)_N/A	1
.. 2	LCD	327-0000-00084	SVLM0038401	LCD TFT_Transmissive_128x128 Pixels_1.50 inch_IM152FBN7A_LG INNOTEK_262K Color,FPC type	1
.. 2	LCM CONNECTOR SPONGE	415-72160-0003	MPBZ0268301	GASKET_7216_BLACK_PORON_N/A_LCM CONNECTOR SPONGE_GUAN YI(WUJIANG)_N/A	1

.. 2	SPEAKER Rubber	415-72160-0013	MHGZ0032701	HOLDER_7216_BLACK_RUBBER、SILICON RUBBER_N/A_SPEAKER Rubber_KJR_N/A	1
.. 2	LOUD SPEAKER	313-0000-00137	SUVT0006401	LOUD SPEAKER_YD-1812FS_12 * 18 mm_8 Ohm_92.5dB_CHANG ZHOU YU CHENG_± 3dB, H=3.4mm,Spring contact	1
.. 2	Rear Cover Ass'y	8M02-7216-S001	ACGM0147901	Rear Cover Sub- Ass'y_7216_SILVER_Rear Cover Sub- Ass'y	1
... 3	Rear Cabinet	402-72160-0001	MCJN0113701	Rear Cabinet_7216_SILVER_PC_Painting_Rear cover_A-TEK PRECISION(SUZHOU)_N/A	1
... 3	I/O cover	405-72160-0002	MCCE0057701	Cover_7216_BLACK_TPU_N/A_I/O cover_KJR_N/A	1
... 3	Rear cover sponge	415-72160-0006	MPBZ0268401	GASKET_7216_BLACK_PORON_N/A_Rear cover sponge_GUAN YI(WUJIANG)_N/A	1
... 3	Shielding case For BB	415-72160-0012		CASE_7216_SILVER_STAINLESS STEEL_N/A_Shielding case For BB_PLIGHT(JIANGSU)_N/A	1
... 3	Vibrator	320-0000-00060	SJMY0010401	Vibrator Bar Type_Y0408A-400350262-0021_R2.0+4.5*5.2*12.4mm_LNLON_Spring contact type	1
... 3	Rear cover sponge for spe aker	415-72160-0014	MPBN0084601	GASKET_7216_BLACK_PORON_N/A_Rear cover sponge for speaker_GUAN YI(WUJIANG)_N/A	1
... 3	WATER DISSOLVE LABEL	478-221100-003	MLAB0006501	Mech. Label_2211_Global_WATER DISSOLVE LABEL_ROUND DOT TYPE 3*5mm_E-LIN(KUNSHAN)	1
.. 2	Antenna	330-0000-00172		ANTENNA EMBEDDED_7218_DUAL BAND(GSM/DCS)_GRAY_NC036IA86_SKYCROSS_FPC+carrier Type	1
.. 2	Antenna Cap Mylar	415-72160-0004		SHEET_7216_SILVER_PC_N/A_Antenna Cap Mylar_GUAN YI(WUJIANG)_N/A	1
.. 2	Screw	409-00000-0105		Machine Screw_Flat_Cross(JCIS)_1.6mm_5.0mm_BLACK_Steel_Plating Zinc_H.N.M_Add Nylok thickness,torque 0.6	6
.. 2	Main Lens	403-72160-0001	MWAC0134401	Lens_7216_BLACK_PMMA+PC_N/A_Main Lens_DAEJIN_N/A	1
.. 2	MIC RUBBER	415-72160-0011	MHGZ0032801	HOLDER_7216_BLACK_RUBBER、SILICON RUBBER_N/A_MIC RUBBER_KJR_N/A	1
.. 2	Mylar For Pcb	415-72160-0019		SHEET_7216_TRANSPARENT_PET_N/A_Mylar For Pcb_GUAN YI(WUJIANG)_N/A	1
.. 2	Mylar2 For PCB	415-72160-0020		SHEET_7216_TRANSPARENT_PET_N/A_Mylar2 For PCB_GUAN YI(WUJIANG)_N/A	1